TXD048901235

TNRCC

Protecting Texas
by Reducing and
Preventing Pollution

Screening Site Inspection Work Plan

for

Old Brazos Forge
TXD048901235
Brenham, Washington County, Texas

Prepared in cooperation with the
U.S. Environmental Protection Agency

March 1996

SCREENING SITE INSPECTION WORK PLAN

Old Brazos Forge

Brenham, Texas

TXD048901235

SIGNATURE PAGE

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Texas Natural Resource Conservation Commission
and
U.S. Environmental Protection Agency

Prepared by

Environmental Assessment Section
State Superfund Staff
Austin, Texas

March 1996

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NOTE

The State predecessor agencies: Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Natural Resource Conservation Commission (TNRCC). The new agency, TNRCC, became effective September 1, 1993, as mandated under State Senate Bill 2 of the 73rd Regular Legislative Session.

SECTION 1

INTRODUCTION

The Texas Natural Resource Conservation Commission (TNRCC) has been requested by the U.S. Environmental Protection Agency (EPA) Region VI to conduct a Screening Site Inspection (SSI) at the Old Brazos Forge (OBF) site (EPA Identification number TXD048901235). The facility was operated as a wire shelving manufacturing facililty by Hussman Corporation (Hussman) during the period from 1965 to 1988. Hussman sold the facility to Recycled Products Corportation (RPC) on May 31, 1992 who subsequently sold the facility to Reconversion Technologies of Texas, Inc. (Retek) on August 1, 1992. (Ref. 5 and 14)

The OBF site consists of approximately 20 acres located at 1709 Highway 36 North, northwest of Brenham, Washington County, Texas. The remaining structures at the facility include a metal plant building covering approximately 110,000 ft^2 and located on the eastern side of the property with a concrete covered parking lot located between the building to the west and Highway 36 to the east. Three former settling lagoons with a combined area of approximately 2.4 acres are located in a separate fenced area northwest of the plant building. The site is currently inactive. (Ref. 5 and 6)

Results of previous laboratory analyses of soil samples collected from an unnamed intermitten drainage channel adjacent to the site and water samples collected from on-site monitor wells and nearby residential drinking water wells indicate that surface water runoff and ground water are the contaminant exposure pathways of concern (Ref. 5).

The purpose of this work plan is to describe the site reconnaissance and sampling activities which are planned at the site to determine if further action is required as described below.

WORK PLAN OVERVIEW

The purpose of the SSI is to document the release(s) or potential release(s) of hazardous substances from identifiable sources which may have migrated off-site. This work plan was developed using available information obtained through a review of TNRCC central files located in Austin, Texas, TNRCC Region 9 files in Waco, Texas and a review of the PA report prepared by EPA Headquarters, dated January 26, 1983. The information collected from the review of records was evaluated for data gaps and additional information needs were incorporated into the work plan. This plan will be modified as necessary based on actual site conditions encountered.

Section 1 is the introduction. Section 2 is the site background and description, and Section 3 describes the site field work to be conducted. The PA narrative, water well logs and information, site specific Health and Safety Plan, TNRCC FY96 Quality Assurance/Quality Control (QA/QC) Requirements document, and the Site Reconnaissance Checklist are presented as appendices A through E, respectively.

SITE OBJECTIVE WITH RESPECT TO THE PREREMEDIAL PROCESS

The preremedial stage of the Superfund process involves a PA and a site inspection (SI) stage consisting of an SSI and, if necessary, a listing site inspection (LSI). This SSI is being conducted to determine if the above-referenced site is eligible for proposal to the National Priorities List (NPL) under the Federal Superfund Program. The SSI will focus on assessing the threat along the groundwater, surface water, and soil exposure pathways within the site.

A PA has already been completed for the site. This SSI will build upon existing data by obtaining additional background information relevant to the site through a file review and collecting environmental samples to further characterize conditions at the site. Sampling conducted during the field work will attempt to document hazardous substance migration to and from the site from potential sources, and look for evidence of actual human and environmental exposure to contaminants.

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SECTION 2

SITE BACKGROUND AND DESCRIPTION

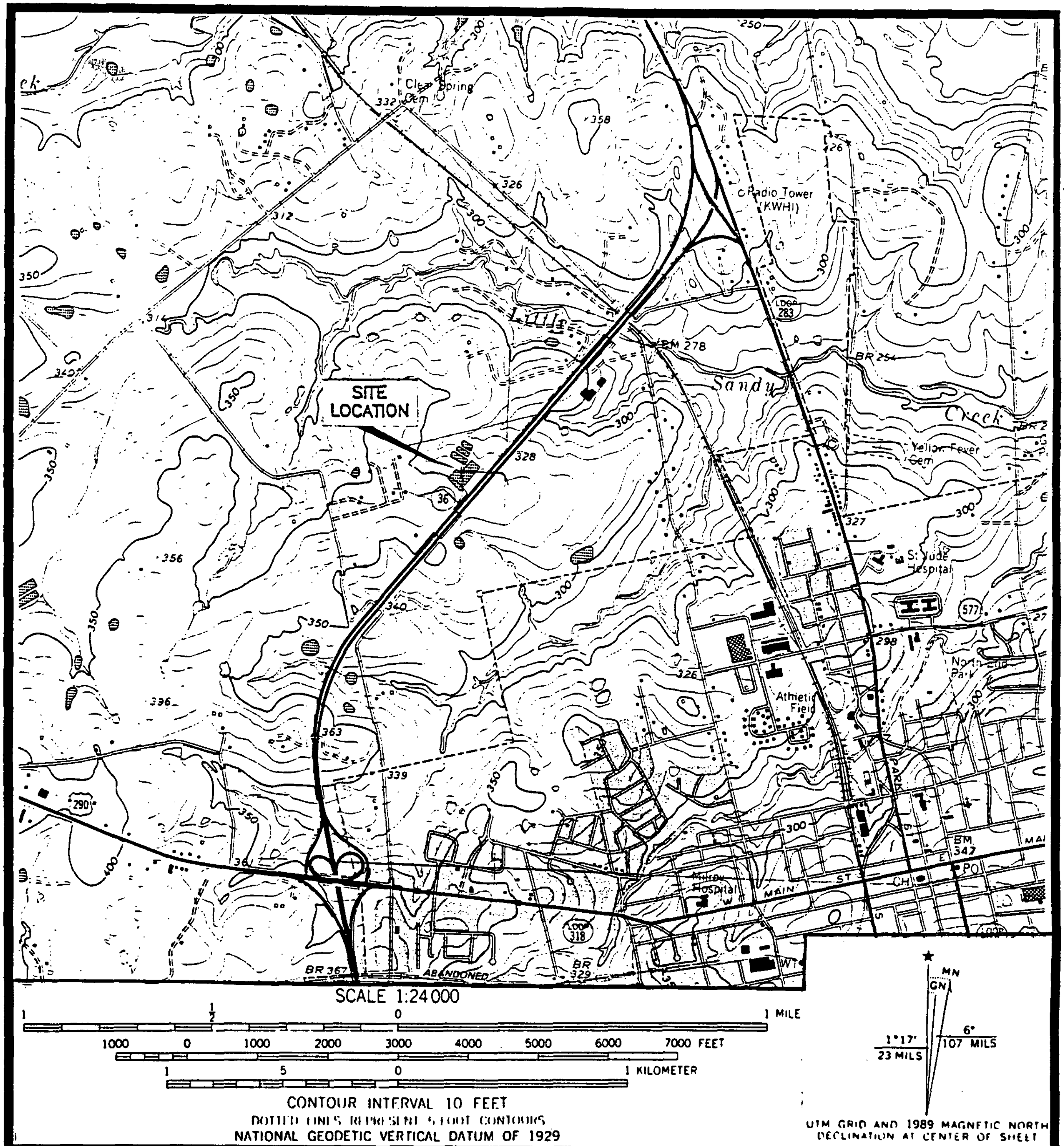
SITE INFORMATION

The OBF site is located at 1709 Highway 36 N., Brenham, Washington County, Texas (Fig. 1). The site is located in an undeveloped area approximately 0.3 miles northwest of the city limits of Brenham in central Washington County. The site is bounded on the west and northwest by an unnamed ephemeral stream, on the east and southeast by Highway 36 N., and on the south by undeveloped land. A residential neighborhood borders the facility to the southwest (Fig. 2). The entire site is fenced with the exception of the easternmost portion of the property which is bounded by a parking lot and facility building. Entrance to the fenced portion of the site from Highway 36 N is through a locked gate located south of the building. The geographic coordinates of the site are approximately 29° 25' 07" north latitude and 30° 10' 56" west longitude. (Ref. 3 and 4).

Hussman began operation of the OBF site as a wire goods manufacturing and metal plating facility in 1965 on previously undeveloped land. Hussman sold the facility to RPC on May 31, 1992 who subsequently sold the facility to Retek on August 1, 1992. Following the sale of the property by Hussman, the facility was used to manufacture products from recycled plastic and rubber shavings. The facility is reported to be currently inactive (Ref 5, 6, and 7).

The following site specific information was documented for the site during the on-site inspections by TNRCC staff and is shown in figure 3:

> One metal building is located on the eastern side of the property. The building has an approximate area of 110,000 ft^2 and was used as a plant for wire goods manufacturing and metal plating. A concrete parking lot is located east of the plant building and along Highway 36 North with site access from the east (Ref 4 and 7).



TNRCC

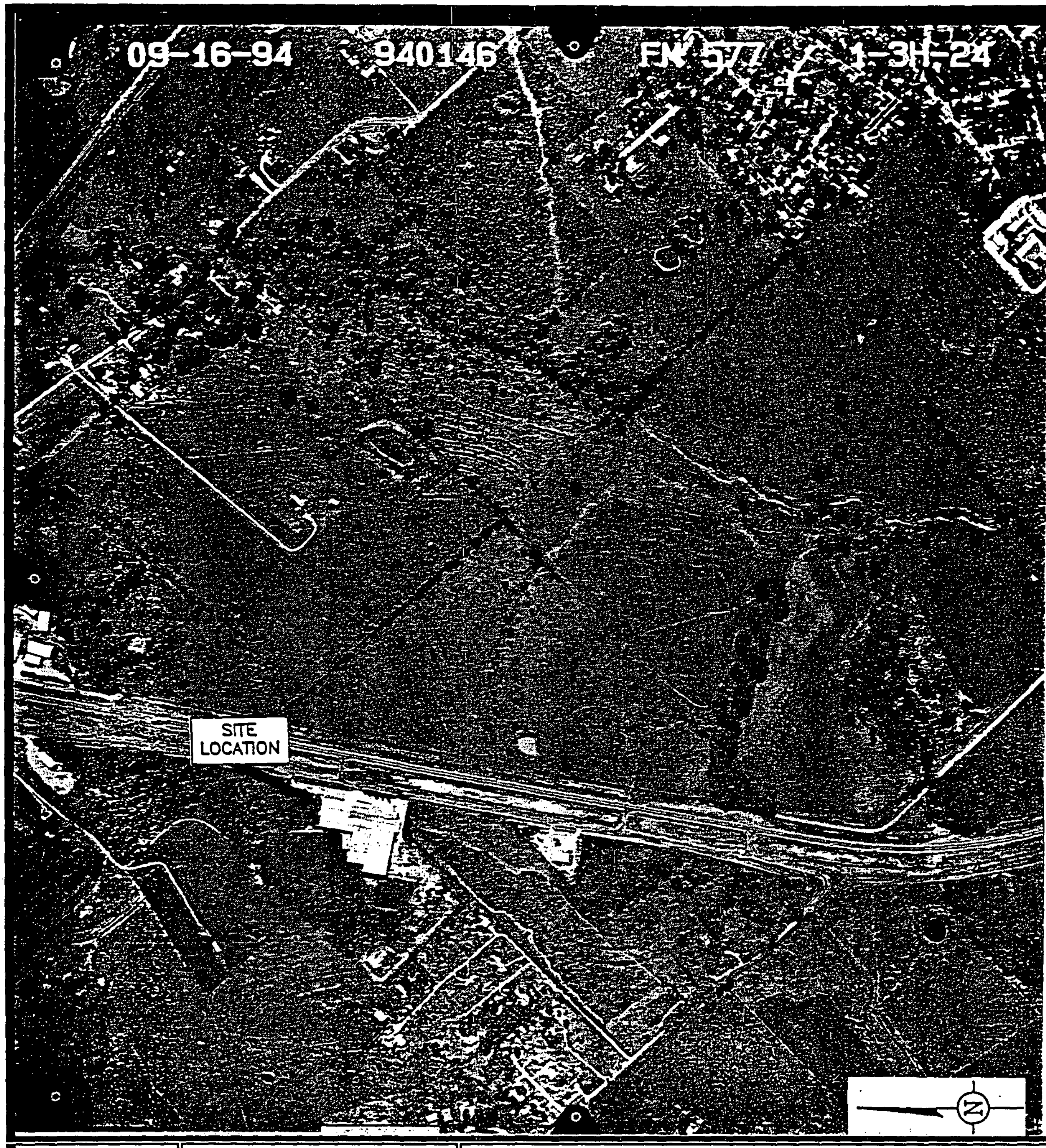
Figure 1

Site Location Map
(Ref. 6)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235



TNRCC

Figure 2

1994 Aerial Photo
(Ref. 7)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

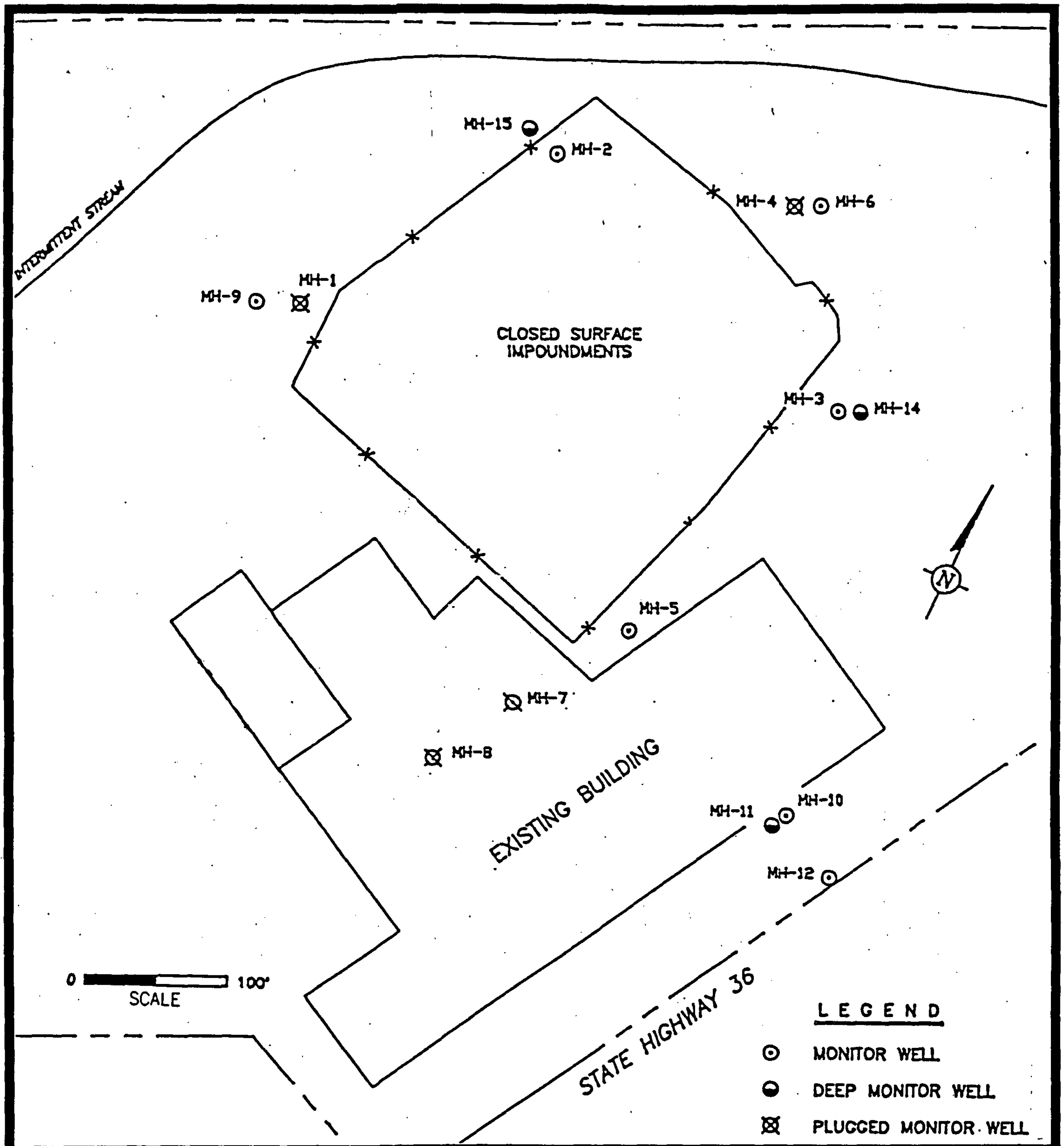


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Figure 3

Site Features Map

(Ref. 3, 4, and 5)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

A ground water well is located on the subject property approximately 70 ft west of the building. This well is reportedly completed to a depth of 265 ft below ground surface (bgs) and screened from 223 to 265 feet bgs (Ref 7 and 8). The current condition of the well and the pump is not known.

Three surface impoundments are located within an approximately two acre fenced area northwest of the facility plant building. These impoundments were used as heavy metal flocculation and settling lagoons for effluent discharged from the plant. The impoundments were certified as closed in 1984 after sludge and six inches of soil were removed from the lagoons and disposed (Ref 5).

Prior to the close of the surface impoundments, three unlined trenches directed effluent waste water from the west side of the plant building to a single canal which then flowed to the three surface impoundments. The area encompassing the three trenches was later covered by an addition to the west side of the facility building (Ref 7).

An unnamed tributary of Little Sandy Creek originates from west side of the subject property. This tributary is an intermittent stream/drainage canal which meanders to the north-northeast for a distance of approximately 3,000 feet to the junction with Little Sandy Creek. Field investigations conducted by TNRCC personnel revealed that the facility was discharging waste water from the lagoons to the intermittent stream without a permit (Ref 4).

The PA, dated January 26, 1983, is located in appendix A and addresses the air, groundwater, and surface water exposure pathways of concern. Discussion of these pathways is summarized in the following sections.

WASTE CONTAINMENT/HAZARDOUS SUBSTANCE IDENTIFICATION

Characteristics

The information used to identify the waste characteristics at the OBF site was obtained from a review of state and federal records and analysis of aerial photographs. The site was identified to have multiple waste source areas, where hazardous substances had been deposited, stored, disposed, or placed, plus soils that have become contaminated from hazardous substance migration. A record review identified cyanide, chromium, zinc, nickel, and copper as the primary potentially hazardous substances of concern located at the site (Ref. 5).

The OBF facility manufactured wire shelving products which involved steel manufacturing and electroplating utilizing metallic salts. From 1965 to 1982 untreated cyanide, chromium, copper, zinc, and nickel bearing sludges and waste water from electroplating operations were discharged into earthen trenches which collected and conveyed the waste to three unlined surface impoundments. Overflow from the surface impoundments was discharged from the surface impoundments through another earthen trench into the unnamed tributary of Little Sandy Creek. Analytical data documenting the release of hazardous substances at the OBF site has been generated from soil and ground water samples collected from the subject facility and surrounding vicinity (Ref 5).

Chemical analyses of soil samples collected from the unnamed tributary by TNRCC personnel in 1984, 1986, and 1987 revealed elevated levels of heavy metals downstream of the facility. Concentrations of chromium, nickel, zinc, and copper were detected at maximum concentrations of 58,000, 34,000, 3,000, 6,000 mg/Kg (Ref 5).

A total of 16 ground water monitoring wells were installed at the facility as part of measures required for the post-closure care and monitoring of the closed surface impoundments. Results of laboratory analyses of water samples from monitoring wells MH-3, 5, and 12 indicated that the ground water beneath the facility contained elevated levels of chromium, copper, nickel, and zinc at maximum concentrations of 0.147, 0.26, 50.9, and 18 mg/l, respectively (Ref 9).

In 1992, 1993, and 1995, ground water samples were collected from area residential water wells located within one mile to the east of the site. Results of laboratory analyses of water samples from the water wells sampled indicated elevated concentrations of chromium as high as 0.056 mg/l in the drinking water aquifer beneath the area (Ref 5).

The specific areas of interest where hazardous substances were either used, stored, or spilled at the OBF site (Fig. 3) include: (1) the former surface impoundments, (2) the area surrounding the three earthen trenches and the single trench formed downstream of the previous three trenches, (3) the outfall area where discharge from the surface impoundments entered the intermittent tributary of Little Sandy Creek, and (4) the unnamed tributary from the outfall to the junction with Little Sandy Creek. The quantity of process effluent and heavy metals discharged from the subject site to the unnamed tributary and underlying soils and ground water could not be estimated with the historical and analytical information (Ref. 4, 5, and 7).

Required Information (Data Gaps)

- Field verify the site features and locations as depicted in Figure 3.

- Field verify the locations of areas previously documented to have contaminated soil as well as areas reportedly subjected to remedial action. Note any areas void of vegetation and obtain soil samples to confirm the release of contaminants.

- Field verify previous operations at the site and any hazardous substances related to these activities through observation and interviews with site personnel.

- Obtain background soil and sediment samples to determine the naturally occurring levels contaminants from unaffected areas adjacent to the site.

GROUNDWATER PATHWAY AND TARGETS

Characteristics

Washington County and the OBF site are located in the Gulf Coastal Plain of Southeast Texas. The stratigraphic units which comprise the aquifers of Washington County range in age from Eocene to Holocene. These hydrologic units, from oldest to youngest, are identified as the Jackson Group of Eocene age, Catahoula Sandstone, Jasper aquifer, and Burkeville aquiclude of Miocene Age. Collectively, these units are estimated to attain a thickness of approximately 6,000 ft, and consist primarily of interbedded sand and clay with lesser amounts of limestone, lignite, gravel, gypsum, and volcanic ash. Regionally, these stratigraphic units dip toward the Gulf of Mexico at an angle greater than that of the land surface, and they tend to thicken and occur progressively deeper basinward (Ref. 10).

Surface outcrops along the Texas coastal plain generally parallel the coast. The Oakville Sandstone and the Fleming Formation are the major surface outcrops covering most of Washington County. The OBF site reportedly lies on the outcrop of the upper section of the Oakville Sandstone which contains the hydrologic units of the Jasper aquifer in the lower portions of the Oakville and the overlying Burkeville aquiclude in the upper portion of the Oakville and lower portion of the Fleming

Formation. The lower portion of the Fleming Formation is comprised mainly of alternating beds of sand and clay and includes massive beds of gray to brown sand interbedded with gray clay silt and sand. The upper portion of the Fleming is predominantly comprised of massive clays with some thin interbeds of sand. (Ref. 11).

The major hydrologic units in the vicinity of the OBF site include the Catahoula Sandstone, Jasper aquifer, and the Burkeville aquiclude. The 300 to 800 foot thick Catahoula Sandstone occurs approximately 400 feet bgs in the vicinity of the subject site and is reported to yield small to moderate amounts of fresh water. The Jasper aquifer occurs within the Oakville Sandstone from approximately 150 feet below the ground surface of the site to a depth of approximately 400 feet bgs to the unconformable contact with the Catahoula Sandstone. The Burkeville aquiclude ranges in thickness from 100 to 120 feet in the Washington County area and functions as a confining unit between the overlying Evangeline Aquifer located farther to the southeast and the Jasper and other aquifers below the Burkeville. The Jasper aquifer is reported to produce moderate to large amounts of fresh water while the Burkeville produces small amounts of fresh water (Ref. 10 and 12).

The Jasper aquifer is the most highly developed hydrologic unit in Washington County with smaller amounts produced from the Catahoula Sandstone and the Burkeville aquiclude. Water quality from these units is reported to be very hard but suitable for public supplies with total dissolved solids ranging from about 300-500 mg/l (Ref. 12). Based upon information of private wells within a 4-mile radius of the site, depth to ground water ranges from approximately 20 to 200 feet bgs (Ref. logs, Appendix B).

Targets

There is documentation indicating that drinking water wells in the vicinity of the site have apparently been contaminated by hazardous substances from the site (Ref 5).

The nearest potential groundwater target identified during a search of water well logs is a drinking water well reportedly owned by Kenneth Blum (State Well No. 59-53-6Z). This well is located within a 0.5 mile radius of the site (see water well location map, Appendix B). The estimated depth of this well is 90 feet bgs and it is screened between the interval of 70 - 90 feet bgs. This well is used as a drinking water source and has been shown to be impacted with elevated levels of chromium. The owners of this well are currently using bottled water as their drinking water source (Ref. 5, 13, and 15).

An on-site ground water well is located approximately 70 feet east of the plant building. This well is reportedly completed to a depth of 292 feet bgs and was used to supply water for industrial use at the site (Ref 7 and 13). Two additional water wells, one located near the northeast corner of the plant building and the other located near the southeast corner of the building, are believed to have been installed at the site. Information regarding well completion details and use of produced water from these two additional on-site wells is currently unknown (Ref 16).

No wellhead protection areas exist within a 4-mile radius of the site (Ref 17).

The nearest residence is located approximately 200 feet west of the site across the unnamed tributary. An inspection of the subject facility by TNRCC personnel identified an additional water well at the nearby residence. The name of the owner, well completion details, and water quality data are currently unknown for this well (Ref. 7 and 15).

The City of Brenham supplies it's residents with potable water obtained from Lake Somerville on the Brazos River. Emergency water supply is from a City of Brenham water well located in Brenham (Ref. 18).

Public supply, irrigation, industrial, and domestic water wells have been identified within a 4-mile radius of the site using State of Texas water well logs, TNRCC Public Water Supply maps, and TNRCC inspection reports of the OBF facility. Logs for wells within the 1-mile radius of the site and public supply well logs and TNRCC Public Water Supply inspection reports within the 4-mile radius of the site and ground water target calculations are included appendix B. The ground water target populations for domestic wells were calculated assuming 2.2 persons per household for Washington County. The target population was determined by dividing population of Washington County (26,154 persons) by the number of households (11,664) (Ref 19). Populations forpublic supply wells were determined by the listed population served totals from a database of TNRCC public supply well information. Based upon this information, the following populations were defined:

- Within 0 - 0.25 miles of the site, one domestic well, one industrial, and two unknown use wells were identified. Drinking water from these wells is supplied to approximately two people.

- Between 0.25 - 0.50 miles of the site, there are nine domestic wells. Drinking water from these wells is supplied to approximately 20 people.

- Between 0.50 - 1 mile of the site, there are ten domestic wells, one public supply, and one irrigation well. Drinking water from these wells is supplied to approximately 67 people.

- There are 105 domestic, four public supply well and two wells designated as other in the 1 - 2 mile radius from the site. Drinking water from these wells is supplied to approximately 256 people.

- There are 84 domestic wells, nine public supply wells, two industrial wells, and two wells designated as other in the 2 - 3 mile radius from the site. Drinking water from these wells is supplied to approximately 12,082 people.

- There are 266 domestic wells, three public supply wells, one industrial wells, one irrigation wells and nine wells designated as other within the 3 - 4 mile radius from the site. Drinking water from these wells is supplied to approximately 730 people.

Required Information (Data Gaps)

- Field verification of existing well locations within 1 mile of the site. Verify by inspection, photographs, and personnel interviews whether the wells are in use and the number of people served. Obtain addresses, water level measurements, well construction details, well development procedures, water quality test results, and aquifer pumping data from the well owners, if available.

- Sample data from the nearest drinking water wells which may be present within 0.5-miles of the site to determine whether contaminants from the site have migrated to the shallow drinking water aquifer(s).

- Sample data from the nearest public drinking water well located within a 1-mile radius of the site to determine whether contaminants from the site have migrated to the public drinking water aquifer(s).

- Verify the location and status of known and reported on-site water wells.

SURFACE WATER PATHWAY AND TARGETS

Characteristics

The OBF site is located within the Brazos River Basin (Ref. 20). The site is bordered by an unnamed tributary of Little Sandy Creek along its western and northern boundaries, which in turn empties into Little Sandy Creek approximately 3,000 feet downstream from the site. Little Sandy Creek empties into New Year Creek approximately 3.5 miles to the east. New Year Creek subsequently drains to the Brazos River approximately 14 miles east of the junction of Little Sandy and New Year Creeks. The junction of New Year Creek and the Brazos River occurs in Water Quality Segment No. 1202 of the Texas River Basins. The Brazos River along segment 1202 has a surface length of 199 miles and has designated water uses of contact recreation, high quality aquatic habitat, and public water supply (Ref. 20).

No stream gages or TNRCC ambient surface water quality monitoring stations are known to operate along the courses of Little Sandy Creek or New Year Creek. A gaging station is reported to have been operated on New Year Creek near Chappell Hill approximately 8 miles from the OBF site for the period of record of 1948, and 1964-1968. The drainage area for this gaging station is reported as 167 square miles (Ref. 12). No information was found regarding the rates of discharge of Little Sandy Creek and New Year Creek.

Figure 4 depicts the surface water pathway from unnamed tributary to Little Sandy Creek, the Probable Point of Entry (PPE-1) and along the remaining 18-mile surface water segment distance into the Brazos River.

The site is not located within the 100 or 500 year floodplain (Ref. 21).

The 2-year, 24-hour rainfall event in the area of the site is estimated as 4.5 inches with an average annual rainfall of 39.65 inches (Ref. 22 and 23).

Targets

The OBF site consist of approximately 20 acres located on a topographic high with the land surface relatively flat with a general slope to the north-northwest (Figure 1). Surface runoff from the site flows northwestward to the unnamed tributary which has an approximate length of 3,000 feet (Fig. 3). Once in the unnamed tributary, surface runoff is then directed towards Little Sandy Creek (Ref. 6). Little Sandy Creek is considered to be the nearest perennial surface water body to the OBF site. The junction of Little Sandy Creek and the unnamed tributary is identified as the Probable Point of Entry (PPE-1) from the OBF site. The remaining 15 mile in-water segment is contained within Little Sandy Creek and New Year Creek (Fig. 4). It is not known if Little Sandy Creek and New Year Creek are considered as fisheries,

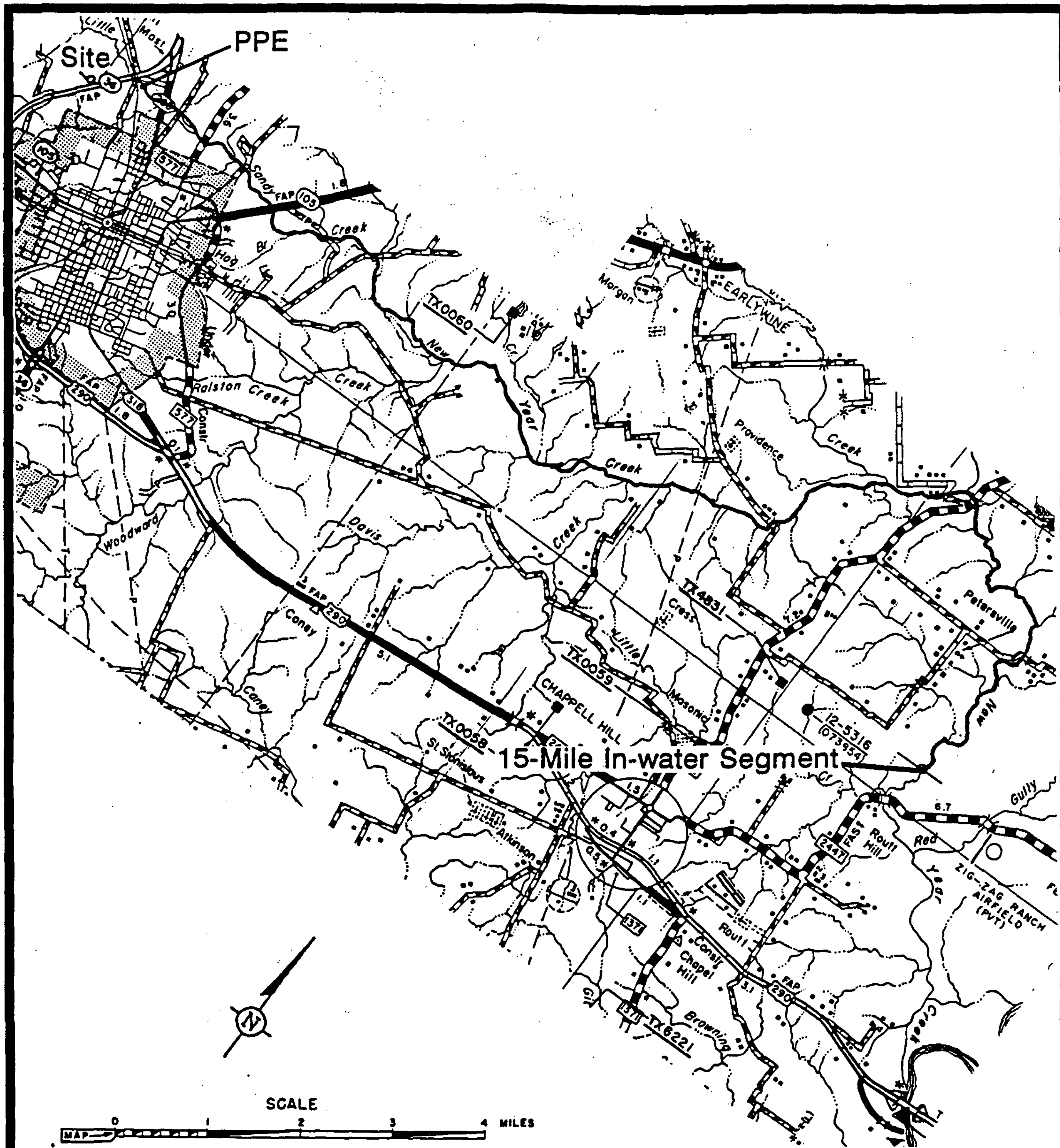
There are no known or suspected surface water intakes located along the 15 mile in-water segment along Little Sandy Creek and New Year Creek. No documentation has been observed to indicate that the surface water is used to irrigate commercial food crops, water commercial livestock or used as an ingredient in commercial food preparation (Ref. 24).

There are no known industrial or domestic facilities with permitted outfalls into the 15 mile in-water segment along Little Sandy Creek and New Year Creek. (Ref. 24).

No known fish kills in the 15 mile in-water segment along Little Sandy Creek and New Year Creek have been documented (Ref. 3).

It is not known if there are any wetlands within 4 miles of the site.

It is not known if there are any threatened of endangered species within a 4 mile radius of the site or along the 15 mile downstream surface water pathway.



TNRCC

Figure 4

Surface Water Pathway Map
(Ref. 24)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

Required Information (Data Gaps)

- Field verification to determine the location of drainage channels and drainage patterns in relation to the contaminant sources.

- Field verification that Little Sandy Creek is a perennial water body and verification whether this Little Sandy Creek and New Year Creek are fisheries.

- Field inspection to determine whether surface water migrating from contaminant source areas enters into the unnamed tributary the Little Sandy Creek.

- Collect sample data to substantiate whether any contaminants have migrated from the site and along the overland migration pathway.

- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site or from the PPE to a distance of 15 miles downstream.

- Obtain background soil and sediment samples to determine the naturally occurring levels of contaminants in unaffected soils adjacent to the site.

SOIL EXPOSURE PATHWAY AND TARGETS

Characteristics

Public access to the OBF site is restricted by means of fencing along the west, south, and northern property boundaries. The access to the eastern boundary of the OBF site is restricted by the plant building (Fig. 3).

The OBF site is located in a generally level area defined by two different soils types: the Bleiblerville clay and the Carbengle clay loam. The Bleiblerville clay is a moderately well drained, dark gray clay with a high organic matter content. This soil is very slowly permeable (less than 0,06 inches per hour (in/hr)), with medium surface runoff (Ref. 23).

The Carbengle clay loam is a well drained dark gray clay loam with medium organic matter content. Runoff from this soil is medium with moderate permeability (Ref. 23).

The site is located in an undeveloped area approximately 0.3 miles northwest of the Brenham city limits. Review of aerial photography of the area surrounding the OBF site indicated scattered residences on largely undeveloped/vacant land. Land use south, west, and north of the site is currently unknown. Adjacent to the east side of the site is State Highway 36, across which is vacant/undeveloped land of unknown use (Ref 4).

Potential sources for off-site runoff applicable to the soil exposure pathway include the closed surface impoundments and the areas surrounding the former earthen trenches. Runoff from these sources would tend to flow northwestward to the unnamed tributary and then northeastward via the tributary channel (Ref. 5).

Targets

There are no schools, day care centers, parks, or other established recreational areas within 200 feet of the site. The nearest occupied residence is located approximately 200 feet northwest of the site across the unnamed tributary (Ref. 3).

There are no known on-site residents or workers as the site is reported to be vacant (Ref 7).

It is not known if there are any wetlands within 4 miles of the site.

It is not known if there are any threatened of endangered species within a 4 mile radius of the site or along the 15 mile downstream surface water pathway.

Required Information (Data Gaps)

- Field verification of drainage patterns and soil exposure pathways surrounding the site.
- Verification that there are not wetlands or threatened or endangered species within 4 miles of the site or along the 15 mile downstream surface water pathway.
- Verification of the distance to the nearest residence and number of occupants.
- Collect sample data to substantiate the presence of hazardous substances in off-site surface soils.
- Collect sample data to attribute any off-site soil contamination to site sources.
- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site. Establish the location of the identified sensitive environments through correspondence or field verification.
- Obtain background soil samples to determine the naturally occurring levels of contaminants in off-site surface soils adjacent to the site.

AIR PATHWAY AND TARGETS

Characteristics

The wind roses for Houston Intercontinental Airport, located approximately 65 miles to the east, is presented in Figure 5. Winds are predominately from the south and southeast, approximately 28% of the time, and wind speeds are generally less than 10 knots (11.5 MPH) 75% of the time (Ref. 28).

There are no records of air monitoring conducted at the AH facility. In addition, there is no analytical data available documenting off-site migration of airborne transported hazardous substances from existing on-site sources (Ref 3 and 8).

No adverse health effects are known to have been reported as a result from migration of hazardous substances through the air (Ref 3 and 8).

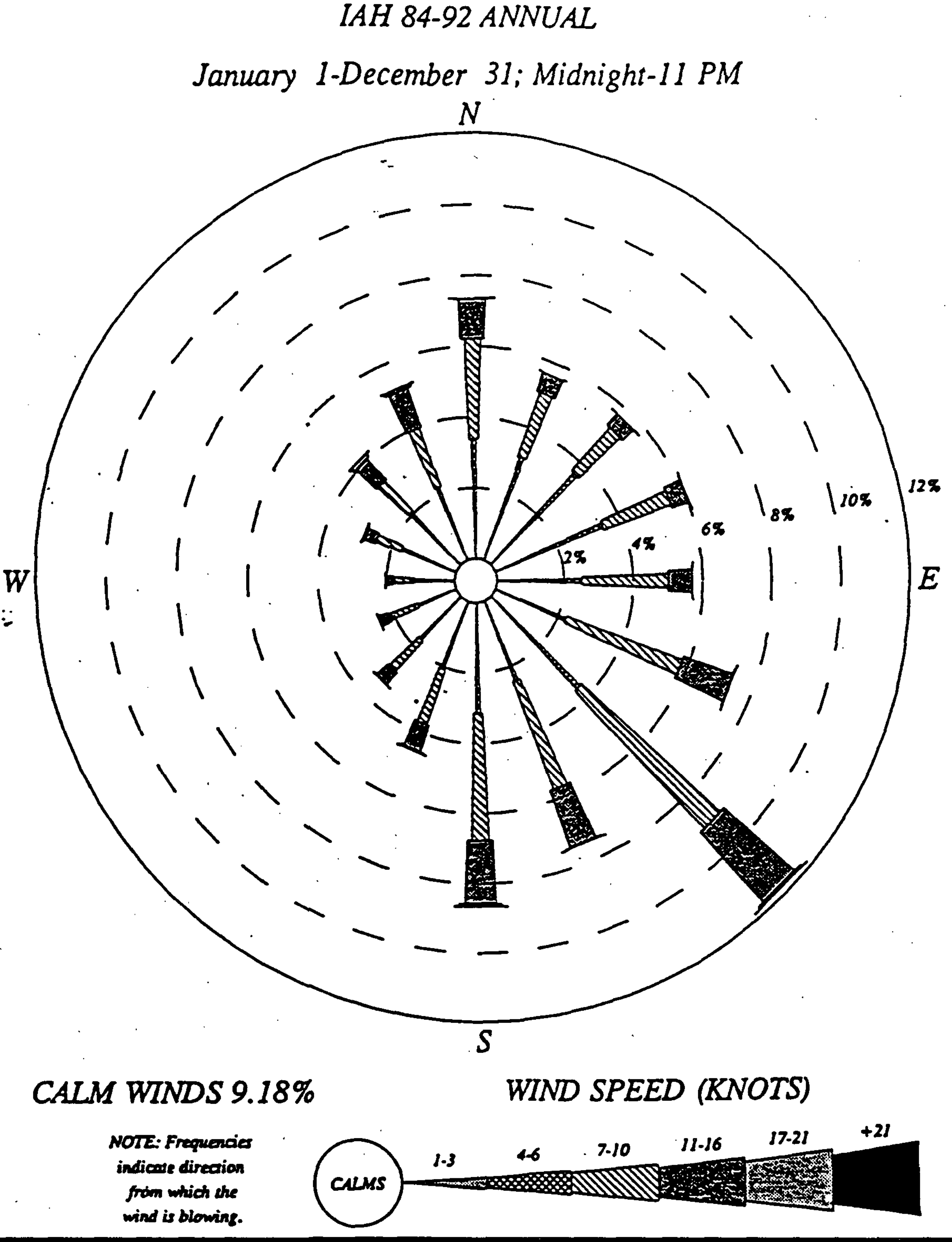
Targets

The OBF site is currently an inactive facility with no known on-site residents. Based on the 1990 Census data of Washington County, the population within a 4-mile radius of the site is 14,086 people. The estimated population residing within the 0 - ¼ mile of the site is 5; within ¼ to ½ mile is 75 people; within ½ to 1 mile is 958 people; within 1 to 2 miles is 5,726 people; within 2 to 3 miles is 5,834 people; and 3 to 4 miles is 1,488 people. Population target information and data calculations are shown in references 19, 6, and 29.

There are no known schools, day care centers, parks, or other established recreational areas within 200 feet of the site. The nearest occupied residence, located approximately 200 feet northwest of the site across the unnamed tributary, would potentially be the nearest individual exposure from a release of hazardous substances from on-site sources to the air pathway. There are 5 schools which have been identified within 4 miles of the site. The number of students attending these schools is not known (Ref. 30).

It is not known if there are any wetlands within 4 miles of the site.

It is not known if there are any threatened of endangered species within a 4 mile radius of the site or along the 15 mile downstream surface water pathway.



TNRCC

Figure 5
Windrose Map
Houston Intercontinental Airport (Ref. 24)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

Required Information (Data Gaps)

- Field verification of drainage patterns and soil exposure pathways at the site.
- Field verification of the distance to the nearest resident subject to exposure from a release of hazardous substances through the air.
- Field verification of potential targets in the target distance radii, in particular those located downwind to the north and northwest.
- Verification that there are not wetlands or threatened or endangered species within 4 miles of the site or along the 15 mile downstream surface water pathway.
- Verification that there have been no reports of adverse health effects potentially resulting from releases of hazardous substances from the site into the air.
- Sample data from off-site sediment and surface soils to attribute air releases to site sources.
- Obtain background soil samples to determine the naturally occurring levels of contaminants in off-site surface soils adjacent to the site.

SECTION 3

SITE NONSAMPLING DATA COLLECTION AND FIELD WORK

The Texas Natural Resource Conservation Commission (TNRCC) will perform the activities described in this section to provide site background information and analytical data that can be used by the EPA to evaluate the site using the Hazard Ranking System (HRS). This information will be presented in a documentation report that includes groundwater, soil, and sediment sampling as discussed below.

All field work will be conducted in accordance with the health and safety plan (HSP) and the TNRCC-approved quality assurance project plan (QAPP). The HSP and QAPP are in appendices A and B, respectively. These plans will be reviewed by all personnel upon arrival at the site.

PERSONNEL REQUIREMENTS AND RESPONSIBILITIES

The TNRCC Central Office Technical Director for this screening site inspection (SSI) is Mr. Wesley Newberry and the TNRCC Program Manager is Mr. Allan Seils. The TNRCC Site Investigation Manager is Mr. Ray Newby. Other team members will be identified prior to the sampling event. The TNRCC's Central Office mailing address is Pollution Cleanup Division, Emergency Response and Assessment Section, P.O. Box 13087, Austin, Texas 78711-3087, (telephone no. (512) 239-2514, FAX no. (512) 239-2527).

The TNRCC Central Office Program Manager and Site Investigation Manager are responsible for identifying, assigning, and organizing the staff to execute the activities required to complete the SSI. The Site Investigation Manager is responsible for completing the activities described in this plan and adhering to the sampling activities and report schedule. The planned field schedule for activities at the Old Brazos Forge site is presented in Table 1.

The TNRCC Technical Director and Program Manager will review all major reports and provide technical and administrative support to the Site Investigation Manager. The TNRCC Technical Director will review the work plan and final report and will approve the final versions. In addition, the TNRCC Technical Director and Program Manager will provide oversight for the field activities during the investigation. The EPA Region VI site assessment manager (SAM) is responsible for approving the sampling activities work plan and reviewing the final report.

COMMUNITY RELATIONS

Prior to the start of any work at the site, TNRCC will inform the appropriate Washington County and/or City of Brenham authorities of the intended site visit. Individual residents and businesses in the immediate area will be contacted by letter from the TNRCC or during the off-site reconnaissance visit. Requests for site-specific information will be made during the interview process or identified in the letter from the TNRCC. TNRCC will make no other formal notifications of the SSI sampling events. Sample results will be sent to each property owner, for their property only, upon completion of the data quality assurance process. Any requests for information before or after the planned site inspection which the TNRCC receives from the above will be referred through the PA/SI Program Manager for an appropriate response. Any requests for information by the news media or parties not associated with the site will be directed through the TNRCC Technical Director or his designee to the TNRCC Central Office Media Relations Office, P.O. Box 13087, Austin, TX 78711, telephone (512) 239-5000.

The TNRCC Program Manager will provide each member of the TNRCC inspection team and the Site Investigation Manager with letters of introduction stating the purpose of the investigation and authorization to conduct appropriate field activities. The TNRCC will send notification letters to the appropriate site representatives informing them of the impending sampling activities and requesting access authorization for TNRCC inspectors to the site. TNRCC will set up the site visit only after receiving written or verbal access authorization from the property owner or their representatives.

Table 1. Old Brazos Forge
Field Schedule

Time	Activity
	Day 1
1300	Arrive at the site. Review health and safety plan. Conduct initial safety meeting. Conduct orientation (as required) for property owner(s). Verify site specific data. Establish staging area.
1400	Begin off-site reconnaissance. Locate off-site wells, interview owners and verify number of users. Modify off-site sampling plan (if required). Record interview information in field logbook. Purge on-site monitor wells to be sampled.
1630	Begin on-site reconnaissance. Review and modify on-site sampling plan. Prepare shipping and sampling labels. Prepare field logbook.
1830	End of day.
	Day 2
0700	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0800	Begin water well sampling. Record applicable well data in logbook, document sampling locations with photographs, and collect samples. Begin sampling of on-site monitor wells.
1200	Lunch break.
1300	Continue water well water sampling. Continue sampling of on-site monitor wells.
1600	Complete monitor well sampling, packaging and CLP lab documentation. Pack samples for overnight shipment.
1800	Deliver samples for shipping.
1830	End of day.
	Day 3
0700	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0730	Continue ground water sampling. Record applicable sampling data in logbook, document sampling locations with photographs. Begin sediment sampling.
1200	Lunch break.
1300	Continue ground water and sediment sampling.
1600	Complete sediment sampling, packaging and CLP lab documentation. Pack samples for overnight shipment.
1800	Deliver samples for shipping.
1830	End of day.

Day 4

0700	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0730	Continue ground water sampling. Begin soil sampling. Record applicable sampling data in logbook, document sampling locations with photographs.
1200	Lunch break.
1300	Continue ground water and soil sampling.
1600	Packaging and CLP lab documentation. Pack samples for overnight shipment.
1800	Deliver samples for shipping.
1830	End of day.

Day 5

0700	Arrive at the site. Review health and safety plan. Conduct daily safety meeting. Review sampling strategy and prepare equipment.
0730	Complete ground water and soil sampling. Record applicable sampling data in logbook, document sampling locations with photographs.
1200	End of day.

WORK PLAN ACTIVITIES

Task 1: Nonsampling and Sampling Activities and Rationale

The field team will first meet with property owner representatives (if specifically requested) and appropriate City and County authorities at the site. The purpose of the meeting will be to conduct an initial safety briefing and review the intended sampling work schedule. Information concerning past and current site conditions outlined in the PA and SSI work plan will be discussed and verified. The Site Investigation Manager will record significant comments in the field logbook pertaining to site history and current/past operations.

After the initial meeting, an off-site reconnaissance inspection will be completed by designated team members. Information will be logged in the field logbook to include names of individuals interviewed, physical/mailing addresses, date and time of interviews, and observations noted. Information outlined in the Site Reconnaissance Checklist (Appendix E) applicable to off-site requirements will be obtained during the inspection. The off-site reconnaissance will be conducted at level D protection.

The initial on-site reconnaissance inspection will be accompanied by the owner or his designated representative, if available, to assist in identifying potential site hazards. Appropriate safety equipment will be required by each team member, which will include field respiratory protection with a combination organic/pesticide vapor cartridge and a dust/mist filter suitable for organic wastes. Personal protective equipment will initially be modified level D. If it can be established that volatile and semivolatile vapors are safely below background and action levels, the on-site reconnaissance will continue at modified level D.

Each waste management unit will initially be approached using appropriate ambient air monitoring equipment, such as a photoionization detector (PID) or organic vapor analyzer (OVA), to detect and identify potential volatile organic compounds. Any visual evidence of a release of hazardous substances will be noted to ascertain whether additional protective equipment will be required for the sampling events. In general, site safety requirements will be assessed in the initial site reconnaissance inspection, and safe entry and exit points will be identified for each proposed sampling event.

Upon completion of the site reconnaissance activities, the field team will again review the sampling plan. Sample locations will be adjusted as necessary to ensure that the samples provide sufficient data to properly evaluate the site. Photographs will be taken as required to document site conditions and support observations recorded in the field logbook. Photographs will require at a minimum, the following information for each photograph:

- Site name

- Location
- Name of photographer
- Date and time of photograph
- Description of situation/scene photographed.
- Type of camera, film, and lens setting (Must be 50mm).

The following section describes the proposed sampling plan for the Old Brazos Forge site. This plan may be modified as a result of the on-site reconnaissance and/or noted site access constraints. The samples to be collected and sample rationale are listed in Table 2. Proposed sample analyses, containers, and preservation requirements for the groundwater and soil samples are shown in Tables 3 and 4, respectively. Sample locations will be confirmed during the site reconnaissance inspection and noted in the field logbook. A field copy of this workplan will be annotated by the Site Investigation Manager to reflect actual sample locations.

Table 2. Proposed Samples to be Collected

Sample Matrix	Sample ID	Sample Location	Rationale
Ground Water Samples	GW-01	Off-site drinking water well approximately .75 miles northwest of site	Obtain background and regionally upgradient ground water sample for attribution of contaminants to site source
	GW-02	Off-site drinking water well approximately 1.5 miles southwest of site	Obtain background and regionally upgradient ground water sample for attribution of contaminants to site source
	GW-03	Off-site drinking water well approximately 1 mile northwest of site	Obtain background and regionally upgradient ground water sample for attribution of contaminants to site source
	GW-04	Off-site drinking water well located at the Kenneth Blum residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-05	Quality Assurance/Quality Control (QA/QC)	Duplicate ground water sample collected at the same location as ground water sample GW-04
	GW-06	Off-site drinking water well located at residence adjacent to the west of site and used as a drinking water source.	Determine the extent of the groundwater contamination in immediate vicinity of the site
	GW-07	Off-site drinking water well located at the Jerry Krueger residence (C. Geick well) used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-08	Off-site drinking water well located at the Gall residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-09	Off-site drinking water well located at the Ervin Lueck residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-10	Off-site drinking water well located at the Robert Scheel residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-11	Quality Assurance/Quality Control (QA/QC)	Duplicate ground water sample collected at the same location as ground water sample GW-04
	GW-12	Off-site drinking water well located at the Billy Jasinski residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site

Sample Matrix	Sample ID	Sample Location	Rationale
	GW-13	Off-site drinking water well located at the Bill Tomachefsky residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-14	Off-site drinking water well located at the Morris Faske residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-15	Quality Assurance/Quality Control (QA/QC)	Duplicate ground water sample collected at the same location as ground water sample GW-06
	GW-16	Off-site drinking water well located at the Charles Schulte residence used as a drinking water source	Determine the extent of the groundwater contamination downgradient of the site
	GW-17	On-site monitoring well MH-3 located downgradient of closed surface impoundments	Determine the extent of the groundwater contamination beneath the site
	GW-18	On-site monitoring well MH-5 located near southeast of closed surface impoundments	Determine the extent of the groundwater contamination beneath the site
	GW-19	On-site monitoring well MH-12 located near east boundary of site	Determine the extent of the groundwater contamination beneath the site
	GW-20	On-site monitoring well MH-15 located southwest of closed surface impoundments	Obtain background ground water sample for attribution of contaminants to site source
	GW-21	Quality Assurance/Quality Control (QA/QC)	Duplicate groundwater ground water sample collected at the same location as ground water sample GW-18
Sediment Samples	SE-01	Little Sandy Creek approximately 100 feet upstream from PPE-1	Obtain background sediment sample for attribution of contaminants to site sources
	SE-02	Little Sandy Creek approximately 150 feet upstream from PPE-1	Obtain background sediment sample for attribution of contaminants to site sources
	SE-03	Little Sandy Creek approximately 200 feet upstream from PPE-1	Obtain background sediment sample for attribution of contaminants to site sources
	SE-04	PPE-1 at junction of unnamed tributary and Little Sandy Creek	Assess contamination to perennial waters
	SE-05	Little Sandy Creek approximately 200 feet downstream of PPE-1	Assess contamination to perennial waters
	SE-06	Quality Assurance/Quality Control (QA/QC)	Duplicate sediment sample collected at the same location as sediment sample SE-04

Sample Matrix	Sample ID	Sample Location	Rationale
Soil Samples	SO-01	Unaffected soil area	Obtain background soil sample for attribution of contaminants to site sources
	SO-02	Unaffected soil area	Obtain background soil sample for attribution of contaminants to site sources
	SO-03	Quality Assurance/Quality Control (QA/QC)	Duplicate soil sample collected at the same location as soil sample SO-08
	SO-04	Soil sample from area adjacent to former waste water conduit trenches south of settling lagoons	Assess soil contamination where waste water was formerly discharged from the facility building to open trenches
	SO-05	Soil sample from southeast corner of closed surface impoundments/settling lagoons	Assess possible soil contamination remaining in the vicinity of the lagoons and former drum storage area
	SO-06	Soil sample from area adjacent to former discharge trench north of surface impoundments /settling lagoons	Assess soil contamination where waste water was formerly discharged from the lagoons to open trenches
	SO-07	Soil sample from location of former settling lagoon waste water outfall to intermittent tributary of Little Sandy Creek	Assess soil contamination in vicinity of former outfall and area of previously documented releases
	SO-08	Soil sample from intermittent tributary of Little Sandy Creek approximately 400 feet east-northeast of Highway 36	Assess extent of soil contamination along overland migration pathway
	SO-09	Soil sample from intermittent tributary of Little Sandy Creek approximately 50 feet south of PPE-1	Assess extent of soil contamination along overland migration pathway
QA/QC	FB-1	Not applicable	Field blank for drinking water matrix, QA/QC
	FB-2	Not applicable	Field blank for drinking water matrix, QA/QC
	FB-3	Not applicable	Field blank for drinking water matrix, QA/QC

Table 3. Sample Containers, Methods, Preservatives, and Holding Times for Soil/Sediment

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	14 days
Semivolatile organics	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Pesticides/ PCBs	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	Extract within 14 days of collection and analyze within 40 days of extraction.
Metals/Cyanide	Two 4-ounce widemouth glass jars with Teflon-lined lids	Cool to 4°C	180 days after collection for metals and 14 days for cyanide.

Table 4. Sample Containers, Methods, Preservatives, and Holding Times for Aqueous Samples

Parameters	Sample Container	Preservative	Holding Time
Volatile organics	Two 40-ml widemouth glass vials with Teflon-lined septa	Cool to 4°C	7 days
Semivolatile organics	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Pesticides/PCBs	Two 1-liter amber glass bottles with Teflon-lined lids	Cool to 4°C	Extract within 7 days of collection and analyze within 40 days of extraction.
Metals/Cyanide	One 1-liter polyethylene bottle with a Teflon-lined cap	HNO_3 to Ph<2	6 months (except mercury*) and 14 days for cyanide

* Reference: EPA Contract Laboratory Program Statement of Work for Organics Analysis (March 1990) and Statement of Work for Inorganic Analysis (March 1990).

Waste Containment/Hazardous Substance Identification

The primary contaminants of concern include metal plating wastes generated by the former Old Brazos Forge facility that still remain on-site in existing waste management units (Ref 5). To obtain legally defensible characterization data, two laboratories will be designated to perform EPA-stipulated Contract Laboratory Program (CLP) analytical methods on all samples collected from the site. The specific analytical methods for this sampling event are those listed under the CLP routine analytical services (RAS) contract.

Nonsampling data to be collected include:

- Field verify the site features and locations as depicted in Figure 3.

- Field verify the locations of areas previously documented to have contaminated soil as well as areas reportedly subjected to remedial action. Note any areas void of vegetation and obtain soil samples to confirm the release of contaminants.

- Field verify previous operations at the site and any hazardous substances related to these activities through observation and interviews with site personnel.

Samples collected for the soil exposure pathway will be used to characterize soils and to assess the potential migration of contaminated soils. In addition, a soil sample will be collected to determine the natural occurring background levels of inorganics (metals) and organics (volatiles, semi-volatiles, PCBs and pesticides) in an unaffected off-site location.

Groundwater Pathway

Nonsampling data to be collected includes:

- Field verification of existing well locations within 1 mile of the site. Verify by inspection and personnel interviews whether the wells are in use and the number of people served. Obtain water level measurements, well construction details, well development procedures, water quality test results, and aquifer pumping data from the well owners, if available.

- Verify the location and status of known and reported on-site water wells.

Groundwater samples will be collected to investigate the potential for releases of on-site contaminants to the subsurface aquifer. Contaminant pathways include seepage and infiltration from the closed surface impoundments/settling lagoons and from the unnamed tributary into the underlying aquifer. According to State well log data and observation conducted during the PA reconnaissance, there are a total of 22 recorded wells within 1 mile of the site and three additional wells not recorded within 0.25 miles of the site. There are reportedly three on-site water wells, one well was used for industrial purposes and the use of the other two wells is unknown (Ref 16).

For the purpose of this SSI, thirteen drinking water wells will be sampled for CLP analysis. The groundwater sample from the public supply well located at the Country Place Northwest subdivision located approximately .75 mile west-northwest of the site will be used to characterize background aquifer water quality located upgradient from known site sources. This sample will be designated as the background groundwater sample and numbered GW-01. Two other background ground water samples will be taken from drinking water wells located southwest and northwest of the site approximately 1.5 and 1 mile, respectively, from the site, if the wells are still in use. These samples will be designated as samples number GW-02 and GW-03.

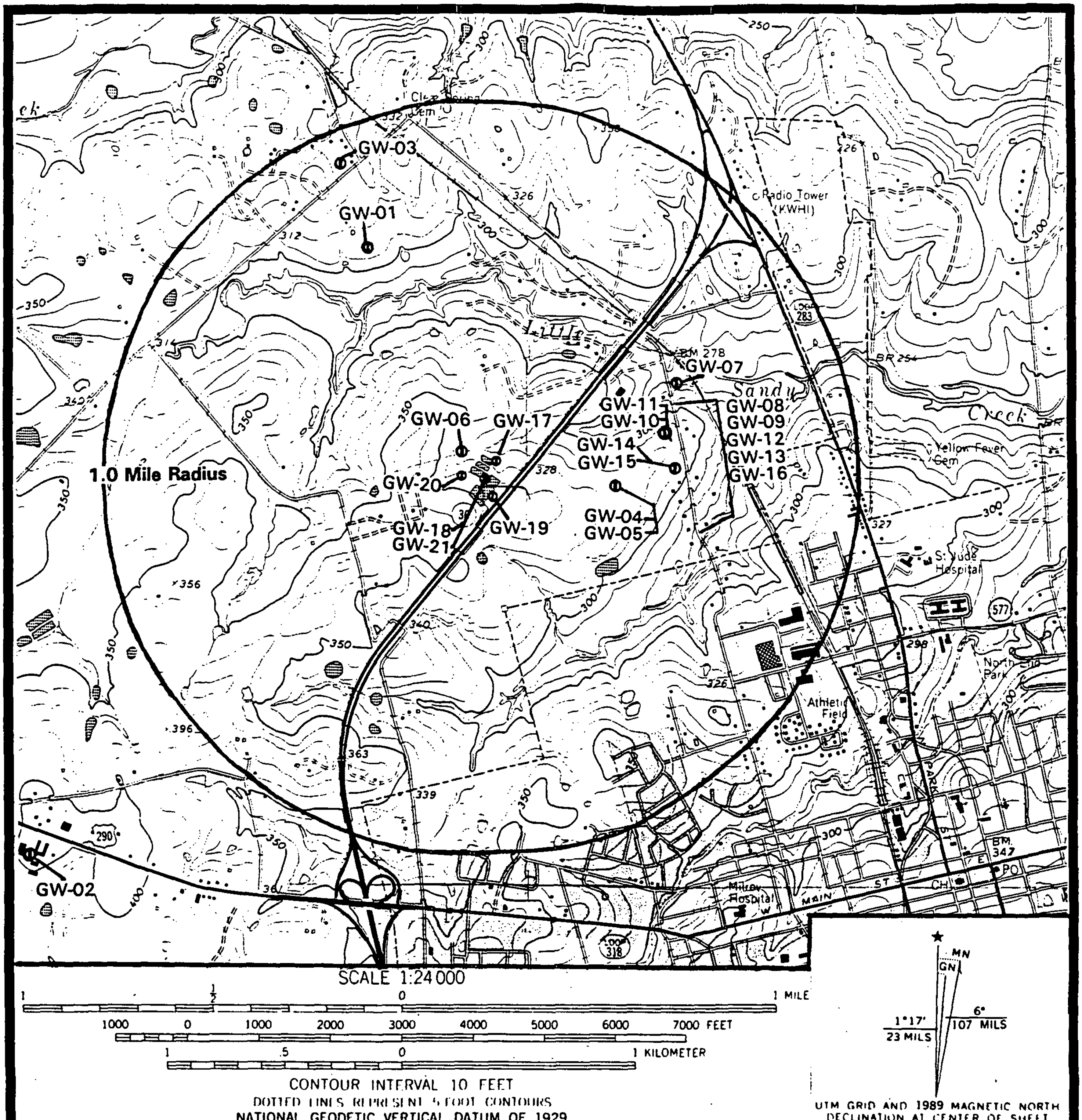
Two drinking water wells located downgradient of the OBF site and previously documented to contain elevated concentrations of contaminants will be sampled. An apparently unregistered water well located adjacent to the west of the facility will also be sampled to assess the extent of ground water contamination beneath the facility and surrounding area. These samples will be designated as samples number GW-04 through GW-07 with a duplicate of one of the drinking water wells numbered GW-05. Seven additional drinking water wells located in the downgradient direction from the site will be sampled to check for the potential contamination. These wells and two duplicates will be numbered GW-08 through GW-16. Well description and sampling rationale are provided in Table 2. Approximate water well locations are illustrated in Figure 1.

During the off-site reconnaissance inspection, if other wells are discovered within the 1-mile site radius which more appropriately represent potential groundwater contamination targets, then the plan will be modified to sample these wells from the drinking water producing zone. The well purging and sampling procedures are dependent on the type of well and are discussed in more detail in the Quality Assurance Project Plan (QAPP).

A total of four monitor wells on the OBF property will be sampled. Monitor wells MH-3, MH-5, and MH-12 and a duplicate will be sampled to assess the extent of ground water contamination beneath the facility. Monitor well MH-15 will be designated as a background groundwater sample. These samples will be numbered GW-17 through GW-21.

As a general rule, all monitoring wells will be pumped or bailed a minimum of three volumes of water in the well casing until three consistent readings of the pH, conductivity, and temperature are achieved before representative samples will be withdrawn. For a well served by a tap, three to five volumes will be removed by letting the tap run. If the system volume is unknown, the tap will be opened and allowed to run for 15 minutes prior to sampling. Field log notes will reflect the well evacuation procedure used. All samples will be collected from the discharge point as close to the well as possible and before the water is processed through any treatment devices. If samples are taken from direct water main connections, the spigot will be flushed for 2 to 3 minutes to clear the line. For private wells with a hand pump, the water will be pumped for 5 minutes before the sample is collected.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Appropriate equipment and personnel decontamination procedures are described in the attached QAPP (Appendix C). Proper sample containers, preservation, and holding times are presented in Table 4 for CLP aqueous samples.



TNRCC

Figure 6
Proposed Groundwater Sample Locations
(Table 2)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

Surface Water Pathway

Nonsampling data to be collected include:

- Field verification to determine the location of drainage channels and drainage patterns in relation to the contaminant sources.

- Field verification that Little Sandy Creek is a perennial water body and verification whether this Little Sandy Creek and New Year Creek are fisheries.

- Field inspection to determine whether surface water migrating from contaminant source areas enters into the unnamed tributary the Little Sandy Creek.

- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site or from the PPE to a distance of 15 miles downstream.

Since there is a potential surface water discharge pathway, a total of five sediment samples will be collected for this SSI. Three sediment samples will be collected from Little Sandy Creek upstream of the junction of the unnamed tributary and Little Sandy Creek, PPE-1, to determine background sediment samples. These samples will be numbered SE-01 through SE-03. Two additional sediment samples will be collected from Little Sandy Creek, one sample at PPE-1 and another sample approximately 200 feet downstream of PPE-1, to assess the extent of contamination to the surface water pathway. These sediment samples will be numbered SE-04 and SE-05, respectively, with a duplicate of SE-04 numbered SE-06.

Sediment samples will be collected from areas of quiescent settling with low hydrologic activity or energy in order to collect a representative fraction of the sediments. Sampling will be performed with dedicated stainless steel spoons. Each of the volatile and non-volatile organic and inorganic sediment samples will be placed in two 4-ounce, widemouth glass jars and sealed with Teflon-lined lids. No headspace will be left in the VOA sample jars. Sample jars will be marked for identification and placed on ice for preservation. Identification markings will include: site location, sample number, date and time of collection, and names of samplers.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Equipment and personnel decontamination procedures are described in the QAPP. Proper sample containers, preservation, and holding times for CLP soil samples are presented in Table 3.

Soil Exposure Pathway

Nonsampling data to be collected include:

- Field verification of drainage patterns and soil exposure pathways surrounding the site.

- Verification of the distance to the nearest residence and number of occupants.

- Field verification that there are no additional sensitive environments or endangered species within a 4-mile radius of the site. Establish the location of the identified sensitive environments through correspondence or field verification.

Based on existing site characterization data, the primary contaminants of concern include metal plating wastes generated by the former Old Brazos Forge facility that: (1) were allowed to discharge directly to three unlined earthen trenches which then flowed into a single trench, (2) that may have been discharged to three unlined settling lagoons on the north central portion of the, and (3) that may have been discharged or flowed overland via surface runoff to an unnamed intermittent tributary of Little Sandy Creek.

A total of nine soil (SO) samples will be collected to substantiate the release of on-site contaminants to adjacent soils. Two soil samples will be collected from an unaffected area located upgradient and upwind from know site waste sources. Laboratory analysis results will be used to identify and characterize naturally occurring levels of inorganics (metals) and organics (volatiles, semi-volatiles, PCBs, and pesticides) for attribution of detected contaminants. These samples will be designated as the background soil samples and numbered SO-01 through S0-02.

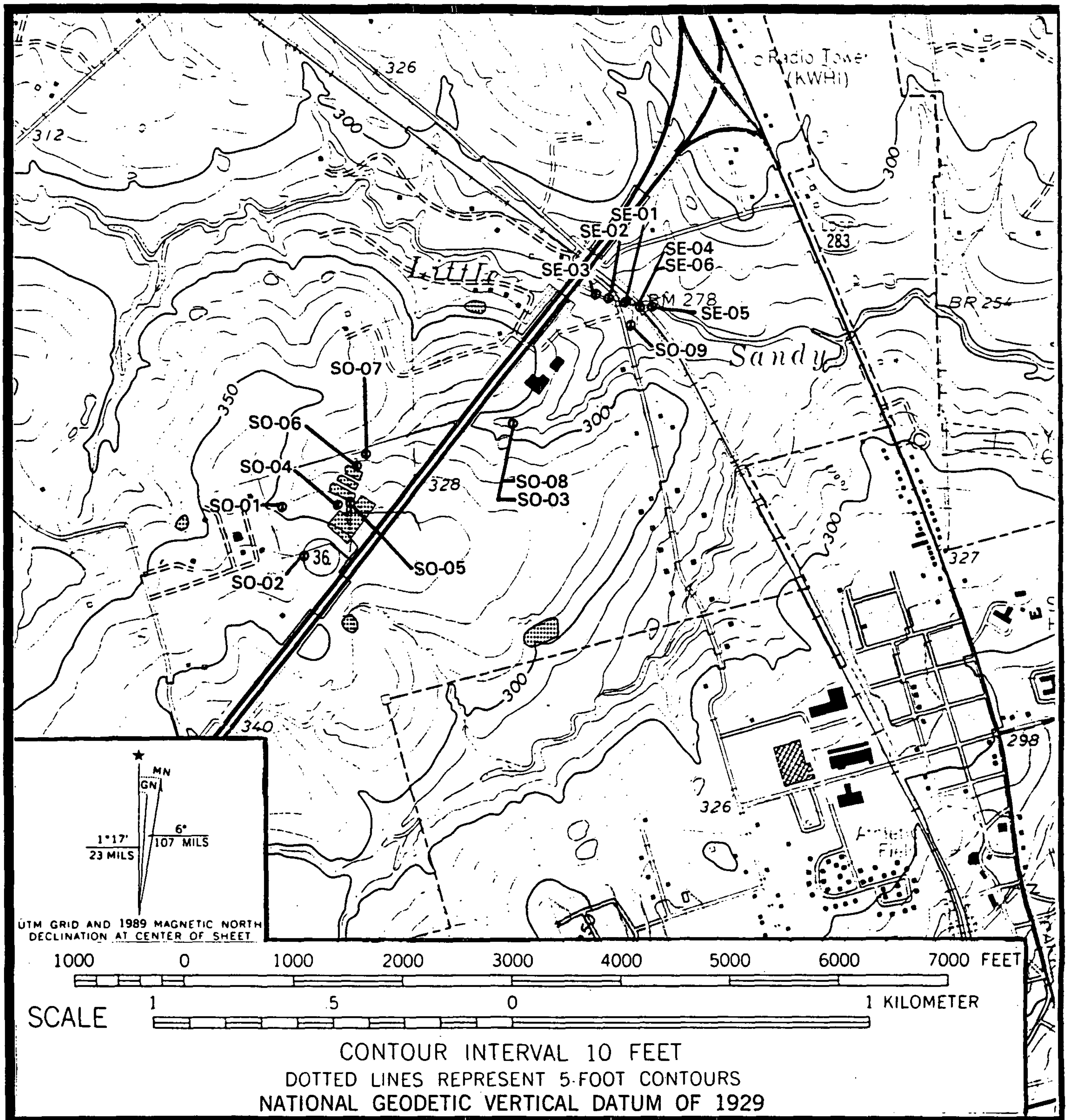
Soil sample numbered SO-04 will be collected north of the closed surface impoundments/settling lagoons to assess the extent of contamination in the area where open trenches conducted waste water from the plant building to the settling lagoons. Soil sample SO-05 will be collected from near the southeast corner of the closed surface impoundments to assess the extent of contamination in the vicinity of the former settling lagoons.

Soil samples numbered SO-07 through SO-09 will be collected from the unnamed intermittent tributary of Little Sandy Creek to assess the extent of contamination along the overland migration pathway to PPE-1. Soil sample SO-07 will be collected at the outfall where waste water was discharged from the settling lagoons to the tributary. Soil sample SO-08 will be collected at a location approximately 100 feet downstream and east of the Highway 36 bridge. Soil sample SO-09 will be collected approximately 50 feet south of PPE-1. Soil sample SO-03 will be collected as a duplicate of soil sample SO-08. These samples are listed in Table 6 and approximate sample locations are illustrated in Figure 1.

Each soil sample will be collected within 6 inches of the upper soil surface (except for the deeper sample). Surface soil samples will be collected using a dedicated stainless steel spoon or trowel. The samples will be collected from a depth as close to the surface as possible, yet deep enough to avoid grass and roots. The deeper soil sample will be collected using a dedicated stainless steel spoon and exposed using a dedicated shovel should the soil be too packed to easily excavate. Soil samples for VOA analysis will be collected first, metals second, and non-volatiles last. Rocks and twigs will be removed as much as possible before placing the soil sample in the jar.

As specified by the QAPP, samples will be placed in glass jars and sealed with Teflon-lined lids. Each of the volatile and non-volatile organic and inorganic sediment samples will be placed in two 4-ounce, widemouth glass jars. No headspace will be left in the VOA sample jars. Sample jars will be marked for identification and placed on ice for preservation. Identification markings will include: site location, sample number, date and time of collection, and names of samplers.

To avoid cross contamination of samples, dedicated sampling equipment will be used. Equipment and personnel decontamination procedures are described in the QAPP. Proper sample containers, preservation, and holding times for CLP soil samples are presented in Table 3.



TNRCC

Figure 7
Proposed Soil and Sediment Sample Locations
(Table 2)

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

Air Pathway

Nonsampling data to be collected include:

- Field verification of drainage patterns and soil exposure pathways at the site.
- Field verification of the distance to the nearest resident subject to exposure from a release of hazardous substances through the air.
- Field verification of potential targets in the target distance radii, in particular those located downwind to the north and northwest.
- Verification that there have been no reports of adverse health effects potentially resulting from releases of hazardous substances from the site into the air.

No air samples are planned to assess releases to the air pathway; however, results of surface soil samples collected for the soil exposure pathway will be used to assess potential for releases to occur to the air pathway. In addition, the field PID used during the initial on-site reconnaissance will provide an indication of the presence of volatile organic compounds in the air at the site.

Quality Assurance/Quality Control Samples

Three types of QA/QC samples will be used in this sampling inspection. Duplicate samples will be taken at the rate of one (1) duplicate per matrix (groundwater and soil) and one (1) duplicate for every ten (10) samples collected. Field blanks will be collected and accompany each ice chest containing groundwater samples shipped for volatile organic analysis. In addition, temperature blanks will accompany each ice chest to the respective laboratories.

A fourth QA/QC sample may be used, as required, in this sampling inspection. Equipment rinsate samples may be collected to establish that proper field decontamination procedures have been employed for sampling equipment which are used more than once in the field.

Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA field blank will be analyzed to monitor for possible sample contamination. The field blank also serves to detect contaminants in the sample bottles. Each field blank will be prepared by filling two VOA vials with CLP-specified grade water and shipping the blanks with the sample bottles. Field blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. The field blanks will be analyzed for VOAs. Results of field blank analyses will be maintained with the corresponding sample analytical data in the project file.

Organic contaminates and some inorganic contaminates may volatilize during collection and subsequent shipment to the laboratory due to warming temperatures in the shipping container; therefore, a temperature blank will be monitored to insure that samples are properly cooled during shipment. One temperature blank per ice cooler will accompany the sample bottles to the laboratory. Each temperature blank will be prepared by filling one VOA vial with deionized water; enclosing it in a bubble bag; taping the package to the interior of the ice cooler and clearly marking it as the "temperature blank". Temperature blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. Results of shipment temperatures will be maintained with the corresponding sample analytical data in the project file.

An equipment rinsate sample(s) will be analyzed to detect possible sample contamination of non-dedicated sample equipment through field decontamination procedures. Each equipment blank will be prepared by filling two VOA vials; one 1-gallon amber glass bottle; and two 1-liter polyethylene bottles with CLP-specified grade water collected from the final rinse of the decontaminated equipment and with shipped the other sample. The equipment rinsate sample(s) will be analyzed for volatiles, semi-volatiles, pesticides/PCBs, metals, and cyanides. Results of equipment rinsate sample(s) analyses will be maintained with the corresponding sample analytical data in the project file.

Task 2: Decontamination Procedures

Equipment Decontamination

Proper decontamination procedures will aid in preserving the representativeness of the samples collected. Dedicated sampling spoons or trowels will be used to collect each soil sample at the site. These spoons or trowels will have been decontaminated prior to arrival at the site and sealed in plastic sealable bags in accordance with the QAPP. After sampling, gross contamination (visible) will be removed from the surface of the scoops or trowels and they will be placed back in their original plastic bag. Further decontamination will be accomplished by a detergent scrub and distilled water rinse at a location away from the investigation site in accordance with the QAPP. To minimize cross contamination, the outside of each sample container will be wiped clean with clean paper towels prior to placing the container into a plastic bag and bubble-wrapping it for shipment. An effort will be made to initially keep the outside of the containers free of gross contamination.

If sample equipment (non-dedicated) must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and an equipment rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater.

Decontamination fluids used to clean equipment will be disposed of on-site in the approximate area of the sampling location in accordance with investigation derived waste (IDW) guidelines. Equipment decontamination will not be necessary for drinking water wells since the water sample is collected directly from the tap.

Personal Decontamination

All disposable clothing (i.e., Tyvek, gloves, etc.) will be rendered unusable prior to disposal to prevent inadvertent reuse. Boots will be scrubbed with detergent and rinsed with distilled water that will be disposed of on-site. Decontamination fluids from the rinse (if used) will also be disposed of on-site. Locations for IDW disposal will be noted in the field log book.

Task 3: Sample Shipping

During sampling activities, samples will be packed and preserved according to procedures described in the QAPP. Excess soil or liquid will be removed from the outside of each sample prior to placing it in a sealable plastic bag and placing it into an ice cooler packed with sealed ice bags. The Site Investigation Manager will assure that all appropriate paperwork necessary to ship samples to CLP laboratories for analysis is completed. Normally, a 35-day turnaround time for RAS will be requested. Details of the sample handling and chain-of-custody (COC) requirements are discussed in greater detail in the attached QAPP (Appendix C).

Samples collected each day will be shipped and delivered daily to the designated CLP laboratory for analysis using an overnight courier. The overnight freight courier pickup point and office schedule in the area of the site is:

Airborne Express (1-800-247-2676)
4005 Airport Blvd, Ste. 1-100
Austin, Texas 78723
Office hours - 8:00 am to 11:00 pm Monday through Friday; Last drop time for same day shipment is 9:00 p.m.

The chain-of-custody forms will be checked, signed, and placed in a sealable plastic bag and taped to the inside lid of the cooler. The outside of the cooler will be sealed with tamper-resistant tape which cannot be removed without tearing it. The sample custodian will sign across the seal prior to shipping the samples. In the event the shipper has to remove the cooler seal, the receiving laboratory will verify and record that the individual container, bottle, or vial sample seals are still intact.

During sampling and sample shipment, the site Investigation Manager (or his designee) will contact the CLP sample management office (SMO) representative, as designated on the CLP RAS Lab Assignment, each day that a shipment is sent. If there are any significant changes to the CLP analytical requirements, contact the TNRCC Central Office, Allan Seils, PA/SI Program Manager at (512) 239-2514, FAX (512) 239-2527 or his designee to coordinate and obtain approval for additional analytical requirements.

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18. Newby, Ray, Texas Natural Resource Conservation Commission, to Larry Firestone, City of Brenham Water Works. Telephone Memo. March 8, 1996. 1 page.

19. Dallas Morning News. 1992-93 Texas Almanac. 1991, 656 pages.

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26.

27.

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30. Southwestern Bell Telephone. Brenham, Texas Telephone Directory. 1994. 250 pages.

APPENDIX A

Preliminary Assessment Report

8212-4

EPA — POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION AND PRELIMINARY ASSESSMENT

REGION: 6

SITE NUMBER (to be assigned by Hq): TX 10561

NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II (*Preliminary Assessment*). File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force (*EN-335*); 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION TXD 048901235

A. SITE NAME: OLD BRAZOS FORGE, INC.

B. STREET (or other identifier): Hwy. 36, P.O. Box 140

C. CITY: Brenham

D. STATE: TX

E. ZIP CODE: 77833

F. COUNTY NAME: Washington

G. OWNER/OPERATOR (if known)

1. NAME: Mickey Walker

2. TELEPHONE NUMBER: (713)838-5626

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION: Wiregoods manufacturing facility with onsite plating facility.

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.): CERCLA Notification - TXS 1099

K. DATE IDENTIFIED (mo., day, & yr.): May 28, 1981

L. PRINCIPAL STATE CONTACT

1. NAME: Jay Snow, P.E., Chief Solid Waste Section, TDWR
Robert Bressett, Field Respresentative, Dist. 7, TDWR

2. TELEPHONE NUMBER: (713)479-5981

II. PRELIMINARY ASSESSMENT (complete this section last)

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☐ 4. NONE ☒ 5. UNKNOWN

RECEIVED

MAR 25 1983

B. RECOMMENDATION

☒ 1. NO ACTION NEEDED (no hazard)

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR:
b. WILL BE PERFORMED BY:

☐ 4. SITE INSPECTION NEEDED (low priority)

C. PREPARER INFORMATION

1. NAME: Mark Rigorgiat, FIT

2. TELEPHONE NUMBER: (214)742-4521

3. DATE (mo., day, & yr.): Jan. 26, 1983

III. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE (Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)

☒ 2. INACTIVE (Those sites which no longer receive wastes.)

☐ 3. OTHER (specify): (Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES (specify generator's four-digit SIC Code): 3471

C. AREA OF SITE (in acres): Unknown

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE (deg.—min.—sec.): 30° 11' 30" N

2. LONGITUDE (deg.—min.—sec.): 96° 15' 00" W

SUPERFUND FILE

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES (specify): Wire goods mfg. and plating facility.

JUL 20 1992

REVIEWED BY (6AEHO) APH DATE 5-3-83

T2070-2 (10-79)

Continue On Reverse

REORGANIZED

Continued From Front

IV. CHARACTERIZATION OF SITE ACTIVITY

Indicate the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

'X'	A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
	1. RAIL		1. PILE		1. FILTRATION		1. LANDFILL
	2. SHIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
	3. BARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
	4. TRUCK		4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
	5. PIPELINE		5. TANK, BELOW GROUND	X	5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
	6. OTHER (specify):		6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
					7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
					8. SOLVENT RECOVERY		8. OTHER (specify):
					9. OTHER (specify):		

E. SPECIFY DETAILS OF SITE ACTIVITIES AS NEEDED

Due to the regulatory actions initiated by TDWR regarding hazardous waste disposal practices by Old Brazos Forge and the ongoing monitoring of the facility by TDWR, no further action is recommended.

V. WASTE RELATED INFORMATION

A. WASTE TYPE

☐ 1. UNKNOWN ☒ 2. LIQUID ☐ 3. SOLID ☐ 4. SLUDGE ☐ 5. GAS

B. WASTE CHARACTERISTICS

☐ 1. UNKNOWN ☐ 2. CORROSIVE ☐ 3. IGNITABLE ☐ 4. RADIOACTIVE ☐ 5. HIGHLY VOLATILE
☒ 6. TOXIC ☐ 7. REACTIVE ☐ 8. INERT ☐ 9. FLAMMABLE

☐ 10. OTHER (specify):

C. WASTE CATEGORIES

1. Are records of wastes available? Specify items such as manifests, inventories, etc. below.

RCRA notification; TDWR manifest shipping control ticket.

2. Estimate the amount(specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

	a. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
AMOUNT	Unknown	Unknown	Unknown	1000	Unknown	Unknown
UNIT OF MEASURE				Gallons		

'X'	a. SLUDGE	'X'	b. OIL	'X'	c. SOLVENTS	'X'	d. CHEMICALS	'X'	e. SOLIDS	'X'	f. OTHER
	(1) PAINT, PIGMENTS		(1) OILY WASTES		(1) HALOGENATED SOLVENTS		(1) ACIDS		(1) FLYASH		(1) LABORATORY PHARMACEUT.
	(2) METALS SLUDGES		(2) OTHER (specify):		(2) NON-HALOGNTD. SOLVENTS		(2) PICKLING LIQUORS		(2) ASBESTOS		(2) HOSPITAL
	(3) POTW				(3) OTHER (specify):		(3) CAUSTICS		(3) MILLING/MINE TAILINGS		(3) RADIOACTIVE
	(4) ALUMINUM SLUDGE						(4) PESTICIDES		(4) FERROUS SMLTG. WASTES		(4) MUNICIPAL
	(5) OTHER (specify):						(5) DYES/INKS		(5) NON-FERROUS SMLTG. WASTES		(5) OTHER (specify):
						XX	(6) CYANIDE		(6) OTHER (specify):		
							(7) PHENOLS				
							(8) HALOGENS				
							(9) PCB				
						XX	(10) METALS				
							(11) OTHER (specify)				

 Continue On Page 3

Continued From Page 2

V. WASTE RELATED INFORMATION (continued)

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE (place in descending order of hazard).

Heavy Metal Salts: Chromium, Cadmium, Lead, Nickel, Zinc, Copper

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

Wastewater treatment facility onsite using chemical flocculation of specific metals followed by secondary clarification using three large earthen lagoons. A field investigation by TDWR on 9/14/81 revealed that Old Brazos Forge was discharging wastewater from (See Attachment A)

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD (mark 'X')	C. ALLEGED INCIDENT (mark 'X')	D. DATE OF INCIDENT (mo., day, yr.)	E. REMARKS
1. NO HAZARD				
2. HUMAN HEALTH				
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY				
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER	X			Heavy Metal contamination found onsit and downstream of lagoon discharge
8. CONTAMINATION OF SURFACE WATER	X			by TDWR. Groundwater monitoring wells drilled at facility.
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL				
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER (specify):				

Continued From Front

VII. PERMIT INFORMATION

A. INDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

☐ 1. NPDES PERMIT ☐ 2. SPCC PLAN ☒ 3. STATE PERMIT (specify): TDWR 30897
☐ 4. AIR PERMITS ☐ 5. LOCAL PERMIT ☐ 6. RCRA TRANSPORTER
☐ 7. RCRA STORER ☐ 8. RCRA TREATER ☐ 9. RCRA DISPOSER
☐ 10. OTHER (specify):

B. IN COMPLIANCE?

☐ 1. YES ☐ 2. NO ☒ 3. UNKNOWN

4. WITH RESPECT TO (list regulation name & number):

VIII. PAST REGULATORY ACTIONS

☐ A. NONE ☒ B. YES (summarize below) Regulatory actions initiated by TDWR to halt wastewater discharge by the facility with development and implementation of an approved plan for closure of the lagoons/hazardous waste site. Surface and groundwater monitoring ongoing in cooperation with TDWR.

IX. INSPECTION ACTIVITY (past or on-going)

☐ A. NONE ☒ B. YES (complete items 1,2,3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
Waste Bisposal	9/14/81 3/10/82	TDWR	Noncompliance discovered. Ongoing
Compliance Insp. and Monitoring	11/10/82		sampling program.

X. REMEDIAL ACTIVITY (past or on-going)

☐ A. NONE ☒ B. YES (complete items 1, 2, 3, & 4 below)

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION (mo., day, & yr.)	3. PERFORMED BY: (EPA/State)	4. DESCRIPTION
Closure of lagoons		TDWR	Remedial action plan to close hazardous waste site from surface infiltration
			mandated by TDWR. Compliance and groundwater testing ongoing.

NOTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

ATTACHMENT A

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT SUPPLEMENT SHEET

Instruction - This sheet is provided to give additional information in explanation of a question on the form T2070-2.

OLD BRAZOS FORGE, INC.

Corresponding number on form	Additional Remark and/or Explanation
V. 4	their plating operation without a permit. Subsequent leachate sample analyses conducted by TDWR indicated that the wastewater discharged from the lagoons was also violation of heavy metal standards established by TDWR.

ECOLOGY & ENVIRONMENT, INC.
REGION VI
MEMORANDUM

TO: Dave Peters, Chief
Hazardous Waste Section

Filed in SA Vol #2

FROM: Mark L. Riforgiat, FIT
E&E Region VI

RECEIVED

MAR 25 1983

THRU: K. Malone, Jr., FITL
Region VI

DATE: January 26, 1983

SUBJ: Old Brazos Forge, Inc. Brenham, TX 10561)
TDD R-6-8212-4A
TXD 048901235

Old Brazos Forge, Inc. is both a RCRA and CERCLA notifier (TXS 1099). The site contains inactive waste conduct ditches leading into three settling lagoons which were flacculant treated for heavy metal precipitation. Field investigations conducted by TDWR revealed that the facility was discharging the wastewater from the lagoons without a permit. Subsequent sample analyses conducted by TDWR further indicated that the discharge was also in violation of heavy metal standards established by TDWR .

Regulatory actions have been initiated by TDWR to halt discharge. The contaminated areas were declared to be a hazardous waste site and Old Brazos Forge, Inc. was directed to develop and implement an approved plan for closure of the hazardous area. January 24, 1982, compliance monitoring programs are ongoing in cooperation with TRDWR, because of active ongoing remedial involvement (see attachments) by TDWR, no further action by FIT is recommended at this time.

A letter advising the facility to comply with closure regulations was issued by TDWR on December 15, 1982.

tm

SUPERFUND FILE

JUL 20 1992

REORGANIZED

EPA **Notificati[illegible] of Hazardous Waste [illegible]**

TXS-000-001-099 000444

United States Environmental Protection [illegible] Washington DC 20460

RECEIVED JUN 10 1981

6AEP

This initial notification information is required by Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:

Enter the name and address of the person or organization required to notify.

Name OLD BRAZOS FORGE, INC.

Street P.O. Box 140

City Brenham State Texas Zip Code 77833

B Site Location: TXD 04-890 1235

Enter the common name (if known) and actual location of the site.

HAZ-TX10561

Name of Site OLD BRAZOS FORGE, INC.

Street Hwy # 36 - North edge of town

City Brenham County Washington State Texas Zip Code 77833

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) Mickey Walker

Phone (713) 838-5626

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1977 To (Year) ~~Present~~ 1981

E Waste Type: Choose the option you prefer to complete

Option 1: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste: Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☒ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify)

Source of Waste: Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☒ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 3001 regulations (40 CFR Part 261).

Specific Type of Waste: EPA has assigned a four-digit number to each hazardous waste listed in the regulations under Section 3001 of RCRA. Enter the appropriate four-digit number in the boxes provided. A copy of the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site located.

F006		
F007		
F008		
F014		

SUPERFUND FILE

JUL 20 1992

REORGANIZED

Form Approved
OMB No. 2000-0138

EPA Form 8900-1

Waste Quantity:

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☐ Landfill
4. ☒ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) ____

Total Facility Waste Amount

cubic feet ____

gallons 1000

Total Facility Area

square feet ____

acres ____

Known, Suspected or Likely Releases to the Environment:

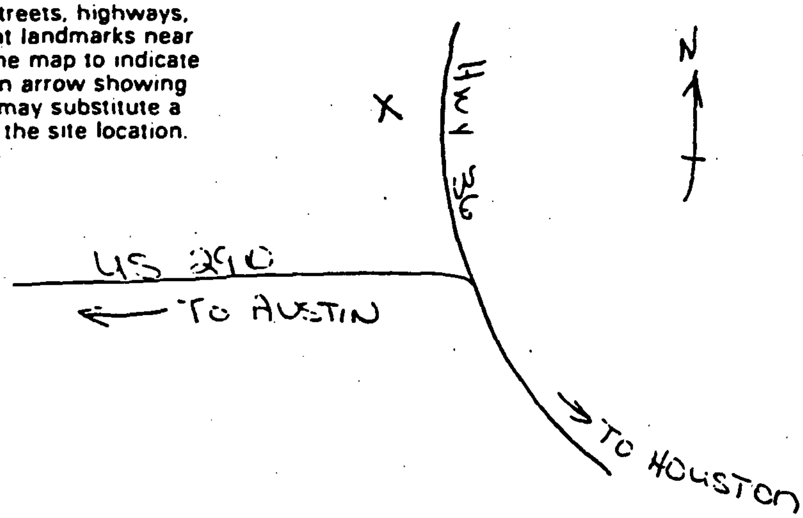
Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.



Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Wire goods Manufacturing Plant

Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required to notify check "Other".

Name Edward Lamar Green, Agent

Street 12605 East Freeway - Suite 509

City Houston State Tx Zip Code 77015

Signature [signature] Date 5/28/81

☐ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☒ Other

EPA

POTENTIAL HAZARDOUS WASTE SITE TENTATIVE DISPOSITION

REGION	SITE NUMBER
6	TX 10561

File this form in the regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

TXD 048901235

A. SITE NAME	B. STREET	
OLD BRAZOS FORGE, INC.	HWY 36 PO BOX 140	
C. CITY	**D. STATE**	**E. ZIP CODE**
BRENHAM	TX	77833

II. TENTATIVE DISPOSITION

Indicate the recommended action*(s)* and agency*(ies)* that should be involved by marking 'X' in the appropriate boxes.

RECOMMENDATION	MARK 'X'	ACTION AGENCY: EPA	STATE	LOCAL	PRIVATE
A. NO ACTION NEEDED — NO HAZARD					
B. INVESTIGATIVE ACTION(S) NEEDED *(If yes, complete Section III.)*					
C. REMEDIAL ACTION NEEDED *(If yes, complete Section IV.)*					X.
D. ENFORCEMENT ACTION NEEDED *(If yes, specify in Part E whether the case will be primarily managed by the EPA or the State and what type of enforcement action is anticipated.)*			X		

E. RATIONALE FOR DISPOSITION

Wire goods manufacturing facility with onsite plating facility found to be in violation of wastewater discharge standards by TDWR. TDWR have initiated action to halt the discharge and have directed the company to develop and implement an approved plan for closure of the hazardous waste area (earthen lagoons

F. INDICATE THE ESTIMATED DATE OF FINAL DISPOSITION *(mo., day, & yr.)*	G. IF A CASE DEVELOPMENT PLAN IS NECESSARY, INDICATE THE ESTIMATED DATE ON WHICH THE PLAN WILL BE DEVELOPED *(mo., day, & yr.)*	

H. PREPARER INFORMATION

1. NAME	2. TELEPHONE NUMBER	3. DATE *(mo., day, & yr.)*
A.L. GARDNER 6AW-SE	214/767-6438	5-3-83

III. INVESTIGATIVE ACTIVITY NEEDED

A. IDENTIFY ADDITIONAL INFORMATION NEEDED TO ACHIEVE A FINAL DISPOSITION.

B. PROPOSED INVESTIGATIVE ACTIVITY *(Detailed Information)*

1. METHOD FOR OBTAINING NEEDED ADDITIONAL INFO.	2. SCHEDULED DATE OF ACTION *(mo., day, & yr)*	3. TO BE PERFORMED BY *(EPA, Contractor, State, etc.)*	4. ESTIMATED MANHOURS	5. REMARKS
a. TYPE OF SITE INSPECTION				
(1)				
(2)				
(3)				
b. TYPE OF MONITORING				SUPERFUND FILE
(1)				
(2)				JUL 20 1992
c. TYPE OF SAMPLING				REORGANIZED
(1)				
(2)				

Continue On Reverse

8

EPA POTENTIAL HAZARDOUS WASTE SITE IDENTIFICATION

REGION: 6

SITE NUMBER: TX 10561

NOTE: The initial identification of a potential site or incident should not be interpreted as a finding of illegal activity or confirmation that an actual health or environmental threat exists. All identified sites will be assessed under the EPA's Hazardous Waste Site Enforcement and Response System to determine if a hazardous waste problem actually exists.

TXD048901235

A. SITE NAME: OLD BRAZOS FORGE INC	B. STREET (or other identifier): HWY 36 N. EDGE OF TOWN

C. CITY: BRENHAM	D. STATE: TX	E. ZIP CODE: 77833	F. COUNTY NAME: Washington 477

G. OWNER/OPERATOR (if known)

1. NAME

2. TELEPHONE NUMBER

H. TYPE OF OWNERSHIP (if known)

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☐ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

J. HOW IDENTIFIED (i.e., citizen's complaints, OSHA citations, etc.): SF TXS 1099 TXD 048901235

K. DATE IDENTIFIED (mo., day, & yr.)

L. SUMMARY OF POTENTIAL OR KNOWN PROBLEM

M. PREPARER INFORMATION

1. NAME: A. Jordan 6AW-SF

2. TELEPHONE NUMBER: 214/767-3274

3. DATE (mo., day, & yr.): 7-27-82

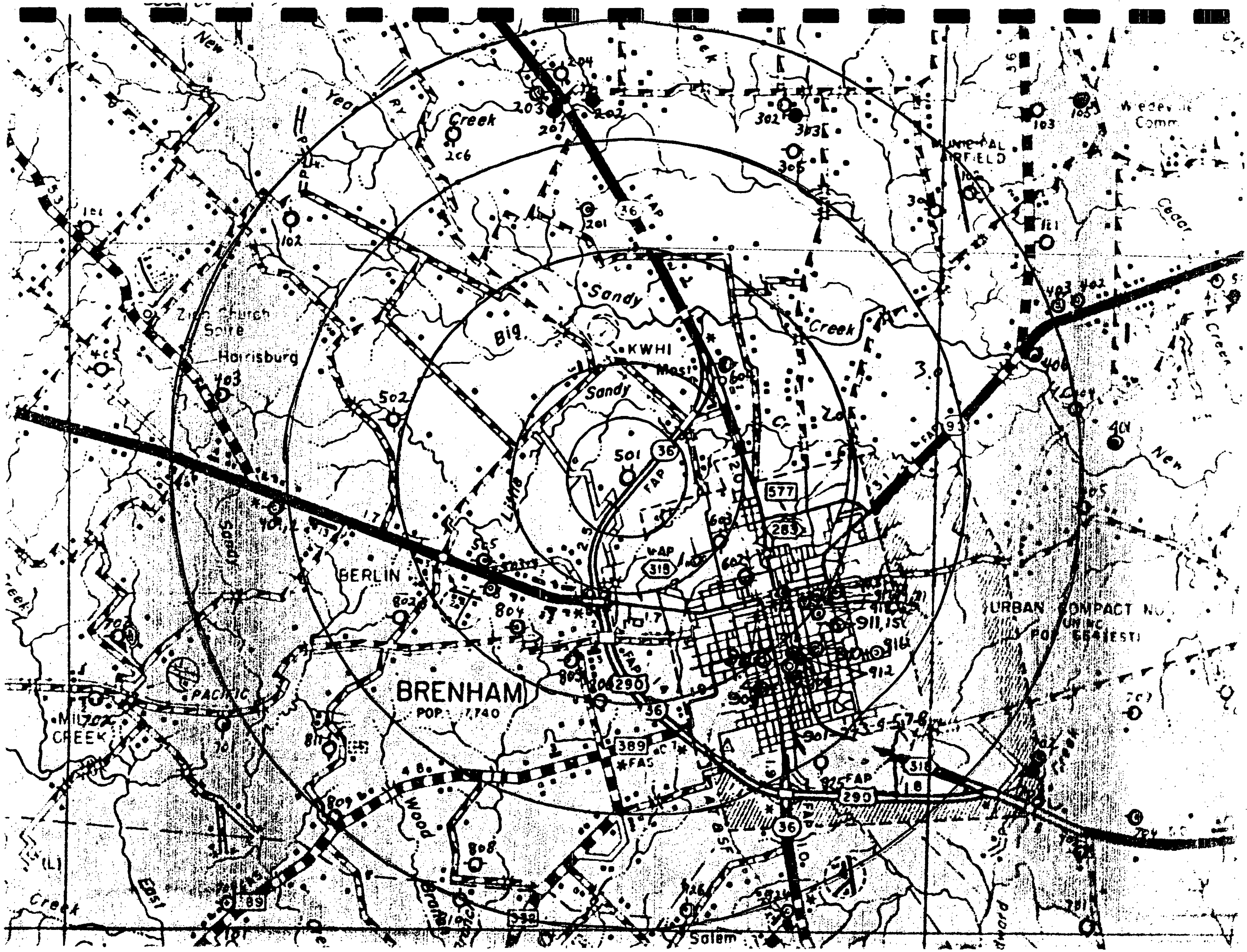
EPA Form 2070-8 (5-80)

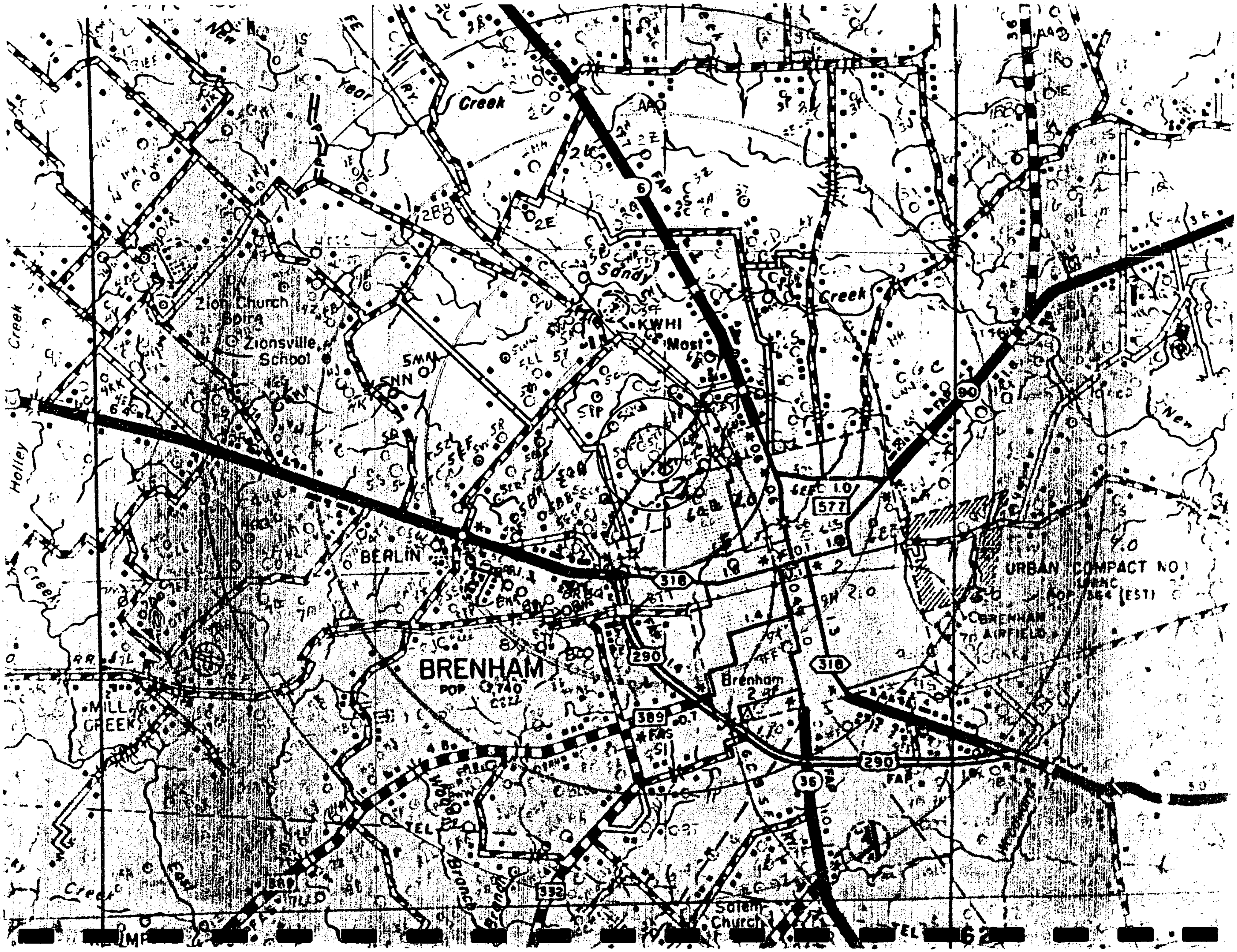
SUPERFUND FILE

JUL 20 1992

APPENDIX B

Water Well Logs - Including Target Populations, and Well Location Maps


BRENHAM
POP. 7,740
BERLIN
Harrisburg
KWHI
Sandy
Big
Creek
URBAN COMPACT NO.
PACIFIC
MIL
CREEK
Salem
FAP
36
290
577
389
318


Creek
Sandy
Creek
Zion Church
Zionsville
School
KWHI
BERLIN
URBAN COMPACT NO.1
BRENHAM
AIRFIELD
BRENHAM
Brenham
MILL
CREEK
Holley
Creek
Creek
Salem
Church
577
318
318
290
290
389
332
36
90
6

0-1	1-2	2-3	3-4
1-I 0-.25	3-PS	8-PS	3-PS
1-Irr	3-D	3-D	11-D
	5-I	1-I	1-Irr
	2-U	7-U	1-I
			9-U

1.

Site Name Old Brazos Forge
Well Type Located
Date 02-29-96

Number Grid YY-59	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner
53-501	0.0	292'	150'	264-284	I	1964		Brazos Forge
53-603	.5-1.0	135	NA	125-135	Irr	NA		Roger Gascamp
53-503	1-2	420'	NA	NA	PS	1959		Brenham Bowling / R.C. Barnes
53-504	1-2	480'	141'	447-480	PS	6-1964		" "
53-505	1-2	167'	112'	158-167	D	5-1965		Edwin Draehn
53-602	1-2	48'	32'	NA	U	1947		Brenham Packing
53-604	1-2	495	100'	475-495	PS	1957		F.C. Kugel
53-804	1-2	168	105'	149-168	D	8-1962		Willie Engelage
53-805	1-2	176	120	156-176	D	4-1964		Leo Hinze
53-917	1-2	660	71	464-542	I	1963		Brenham Mills
53-919	1-2	535	NA	449-535	I	1962		"
53-920	1-2	587	NA	294-416	I	1967		"
53-921	1-2	200	73'	NA	U	1903		"
53-922	1-2	168	40	NA	I	1955		Brenham Bottling
53-923	1-2	180	80	160-180	I	1923		Blue Bell Creamery
53-201	2-3	1070	72	470-1060	I	11-1964		Yegua Dev Corp
53-502	2-3	NA	NA	NA	NA	NA		NA
53-802	2-3	457	128'	NA	D	1965		Vernon Whitmarsh
53-803	2-3	127	NA	NA	D	1950		"
53-806	2-3	63'	48	50-63	D	10-1962		Calvin Borman
53-901	2-3	320	58	NA	PS	1913		City of Brenham
53-902	2-3	185	58'	NA	U	1913		"
53-903	2-3	182	60	NA	U	1913		"

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

U - unknown

Site Name Old Brazos Forge
Well Type Located
Date 02-29-96

Number Grid YY-57	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner
53-903	2-3	182	60	NA	U	1913		City of Brenham
53-904	2-3	96	13'	NA	U	1913		''
53-905	2-3	1515	37'	1295-1495	U	1933		''
53-906	2-3	143	NA	NA	NA	NA		''
53-907	2-3	198	NA	NA	NA	NA		''
53-908	2-3	200+	NA	NA	U	1944		''
53-909	2-3	511	84	95-511	PS	1948		''
53-910	2-3	500	70	83-489	PS	1948		''
53-911	2-3	593	65	73-525	PS	1952		''
53-912	2-3	0	0	0	PS Spring	—		''
53-913	2-3	1504	NA	1216-1500	U	1930		''
53-914	2-3	785	50	NA	PS	1907		Travis Voekel
53-915	2-3	820	42	75-810	PS	11-1963		City of Brenham H.2
53-916	2-3	1013	200	970-990	PS	1968		''
53-918	2-3	598	97	340-577	I	NA		Brenham Mills
53-202	3-4	320	20	298-320	Irr	1965		Charles MacHemehl
53-202	3-4	175	NA	NA	D	1940	Jasper	Richard Spinn
53-204	3-4	104	16'	OH	I	1953		''
53-206	3-4	130	15-20	NA	U	NA		Henry Moore
53-207	3-4	123	0	NA	U	1940		J. F. Presley
53-808	3-4	125	40	115-125	D	1954		Wilfred Nordt
53-809	3-4	105	60	NA	D	1962		J. A. Becker
53-810	3-4	41	33	NA	U	1890		Fred Weiss
53-811	3-4	76	67	NA	U	NA		Charles Hodde

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

Site Name Old Brazos Forge
Well Type Record
Date 02-29-96

Number Grid 59-59	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner
53-925	3-4	700 +	30	NA	U	1895		Louise Stone
53-926	3-4	102	NA	NA	U	1930		Albert Kramer
54-102	3-4	300	NA	NA	PS	1967		Brenham Airport — City of Brenham
54-404	3-4	86	7'	76-86	D	1955		Owen Zeiss
54-405	3-4	52	47'	NA	D	1930		Ed Dever
53-401	3-4	434	NA	NA	PS	1953		Robert Lange
53-402	3-4	436	124	NA	PS	1961		Robert Lange
53-403	3-4	89	53	NA	D	1930		Louis Leck
53-302	3-4	80	6	NA	U	NA		N. W. Freeman
53-303	3-4	261	9	NA	D	1955		N. W. Freeman
53-305	3-4	229	11'	NA	D	1955		N. W. Freeman
53-306	3-4	218	30'	200-218	U	1930		R. C. Jeske
53-102	3-4	356	17	301-356	U	NA		A. D. Spinn
54-406	3-4	75'	NA	50-75'	D	1967		Arnold Thin

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

①

Site Name Old Brazos Forge
Well Type Platted [illegible]
Date 02/29/96

Number Grid YY-59	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-5TT	0-.25								No log?
53-5DD	0-.25								No log
53-5QQ	.25-0.5								No log
53-5UU	.25-0.5								No log
* 53-6Z	.25-0.5	295	75	253-295	D	1978		Billy Jesinsh.	6 wells
53-5PP	.5-1								no log
53-5CC	.5-1								no log
53-5SS	.5-1								no log
53-5BBB	.5-1								no log
53-5GG	.5-1								no log
53-5ccc	.5-1								no log
53-5GG	.5-1								no log
53-5J	.5-1								no log
53-5FFF	.5-1								no log
53-6GG	.5-1	373	56	349-391	D	1976		M. R. Wirtz	
53-6LL	.5-1	263	103	221-263	D	1980		Jimmy Hahn	
53-6Q	.5-1	141	43	120-141	D	1968		Sirilo Vasquez	
53-6U	.5-1	245	85	203-245	D	1969		Willie Brinkmeyer	2 wells D
53-6PP	.5-1	360	47	350-360	D	1981		Ernest Ray Bonke	2 wells D
53-6F	.5-1								no log?
* 53-6P	.25-.5	251	100	221-251	D	1968		Clyde Geick	3 wells
53-6R	.5-1	159	63	129-159	D	1968		Jethro Johnson	
53-5N	.5-1	265	85	223-265	D	1971		Herbert Fesk	
53-6E	.5-1	107	68	50-107	Irr			Arnold Hamilton	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 0.-.25 miles - no logs for wells on map

.25-.5 miles 9 domestic wells

.5-1 miles 10 domestic wells

Site Name Old Brazos Forge
Well Type Plotted 1-2
Date 3-5-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
59-53-5A	1-2				D			A.E. Leonard	4 wells D
53-5AA					D			Floyd Engling	
53-5AAA					D			Fred Roberts	
53-5B					D			Alvin Horath	3 wells D
53-5D					D			Charles Machacek	
53-5E					D			M.R. Wirtz	7 wells D
53-5EE					D			Otto Schroeder	
53-5FF					D			Linda Rogers	
53-5HH					D			Bobby Arndt	2 wells D
53-5JJ					D			Edward Kela	2 wells D
53-5K					D			John Vipalek	3 wells D
53-5LL					D			Bill Nowicki	
53-5M					D			H.B. Finch	
53-5R	"				D			Cecil Kruger	2 wells D
53-5RR					D			Oswald Boecker	3 wells D
53-5S					D			Edmund Mueller	
53-5Z					D			Willie Drews	
53-6A					D			Fred Herman	
53-6B					D			R.C. Jones	3 wells D
53-6BB					D			W.J. Elliott	
53-6EE					D			Burton Mills	
53-6F					D			W.M. Green	
53-6FF					D			Alice Stoker	
53-6G					D			Walter Secker	4 wells D

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 51 domestic wells

Site Name Old Brazos Forge
Well Type Method 1-2
Date 3-5-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-6N	1-2				D			Charles Mateski	2 wells D
53-6JJ					D			J.S. Witherington	
53-6M					D			Henry Koehne	3 wells D
53-6QQ					D			Annie Spitzer	
53-6RR					D			Carolyn Genereux	
53-6S					D			Clarence Hall	2 wells D
53-6SS					D			Eddie Van Dyke	
53-6T					D			M. A. Lankin	2 wells D
53-6UU					D			R. A. Williams	
53-6V					D			David Wegner	3 wells D
53-6W					D			Arthur Ehrig	
53-8CC					D			Jerry Schwake	[illegible] wells D
53-8E					D			George Iweeni	2 wells D
53-8EE	" "				D			G. Pohl	2 wells D
53-8KK					D			A. Schaefer	3 wells D
53-8M					D			Wehring	2 wells D
53-8R					D			Bluebonnet Electric	2 wells D
53-8SS					D			W. Haske	7 wells "
53-8VV					D			Bregham Vet Clinic	2 wells D
53-8W					PS			Sands Motel	
53-8W					D			R. Borman	2 wells D
53-9D					D			C. Klingspom	
53-9H					D			Lee Cook	2 wells D
53-9K					D			Blue Bell	

end of 1-2

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page total 51 domestic
1 public supply

1-2 mile total : 102 domestic wells
1 public supply

Site Name Old Breezes Forge
Well Type Private 2-3 miles
Date 3-5-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-2A	2-3				D			Lennie Gall	
53-2BB					D			Howard Sommerfield	
53-2BB					D			Milbirn Bauer	
53-2E					D			Frank Hansen	
53-2G					D			Ralph Johnston	
53-2H					D			Kenneth Nightower	
53-2H					D			Nolan Hurshe	
53-2G					D			T. W. Ehlert	2 wells
53-2Z					D			Ed Mills	2 wells
53-3M					D			Walter Borchardt	2 wells
53-3S					D			Troy Carr	
53-3Y					D			Erwin Neumann	
53-4BB					D			Richard Swert	
53-4D					D			Delwin Rohde	
53-4J					D			W. F. Wackman	
53-4K					D			Kuss Auto Repair	
53-4Q					D			Fritz Rau	
53-4X					D			Leroy Winkelmann	
53-5C					D			Ray Stolz	
53-5L					D			Gilbert Smith	3 wells
53-5MM					D			James Ross	
53-5NN					D			Don Boeckner	
53-5Q					D			Paul Koster	6 wells
53-6AA					D			Blue Bell	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page total's: 34 domestic wells 2-3 miles

Site Name Old Braves Forge
Well Type Plotted 2-3 miles
Date 3-5-95

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-6C	2-3				D			Joe Nowack	
53-6D	↓				D			Ken Pomykal	
53-6HH					D			Richard Goodlitt	
53-6J					D			Clarence Becker	
53-6K					D			Eugene Schwanke	3 wells D
53-6KK					D			Don Hain	3 wells D
53-6L					D			David Chaney	
53-6MM					D			Mike Brinkmeyer	
53-6N					D			Martin Schultz	
53-6TT					D			Paul Dodd	
53-7H					D			Charles Lubowski	
53-8C					D			Leonard Ulrich	2 wells D
53-8D					D			Ed Mather	
53-8FFF	"				D			W. Norda	3 wells D
53-8L					D			L. Schwartz	
53-8NN					D			E. Tonn	2 wells D
53-8N					D			J. W. Bean	
53-8P					D			L. E. Seidel	
53-8PP					D			B. Randermann	7 wells D
53-8G					~~D~~ I			E. Hart Oil Co	
53-8S					D			N. Drachn	
53-8T					D			A. Wehmeyer	
53-8U					D			H. Grabarschick	
53-8X	↓				D			J. Palousek	3 wells D

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 39 domestic wells
1 industrial

Site Name Old Brazos Forge
Well Type Plotted 2-3 miles
Date 2-6-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner
53-8XX	2-3				D			H Anderson
53-9AA					D			D. Webmeyer
53-9DD					D			D Early
53-9F					D			G.A. Petersen
53-9FF					D			Jack Arlitt
53-9GG					D			L. Landau
54-4A					D			H Fisss
54-4V					D			Ollie Hopes
	end 2-3							

4 wells D

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 8 domestic wells

2-3 mile total 81 domestic wells
1 Industrial

Site Name Old Bronze Forge
Well Type Plotted 3-4 miles
Date 3-5-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-1C	3-4				D			Mick Beleeret	
53-1E	3-4				D			Thomas Blake	
53-1D	3-4				D			Robert Waleewick	
53-2C					D			Albert Campbell	
53-2FF					D			Robert Schoenvogel	
53-2JJ					D			Richard Spinn	
53-2K					D			Bernard Murski	3 wells D
53-2L					D			James Studholler	3 wells D
53-2N					D			Erwin Schultz	
53-2P					D			Clarence Niemeyer	
53-2R					D			Mat Bradshaw	
53-2T					D			Paul Green	7 wells D
53-3C					D			Edwin Grebe	
53-3CC	"				D			R.C. Jeske	
53-3D					D			Richard Brown	2 wells D
53-3E					D			Ike Konieczny	2 wells D
53-3G					D			Ed Hueske	
53-3H					D			Charles Feiss	
53-3J					D			Art Marshall	
53-3P					D			Edwin Grebe	
53-3R					D			Whitney Reynolds	
53-3V					D			Phillip Beaudette	
53-3X					D			M. Ward	3 wells D
53-3Z					D			Boyd Wolfe	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals: 38 domestic wells

e

Site Name Old Brazos Force
Well Type Plotted 3-4 miles
Date 3-5-9?

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-4A	3-4				D			Sam Sjolander	3 wells D
53-4AA					D			Ralph Daniels	2 wells D
53-4C					D			Mildred Darvin	
53-4CC					D			Darrell Krueger	
53-4FF					D			Lang Acres Farms	
53-4GG					D			Monroe Lange	
53-4F					D			J. D. Stanley	3 wells D
53-4H					D			H. D. Lehde	3 wells D
53-4L					D			Joe Cashion	3 wells D
53-4m					D			Donald Lange	2 wells D
53-4mm					D			Margie Fischer	
53-4N					D			Herman Schoppe	5 wells D
53-4P					D			Clinton Pirtz	
53-4PP					D			Lis Peacock	
53-4QG					D			Dennis Landgraf	2 wells D
53-4R					D			Calvin Kurtz	
53-4RR					D			Bill Fischer	3 wells D
53-4S					D			Arthur Cammack	
53-4SS					D			Robert Wilson	3 wells D
53-4T					D			John Chipman	2 wells D
53-4TT					D			Lowell Leatherman	2 wells
53-4U					D			Leroy Boran	2 wells
53-4UU					D			Dennis Landgraf	
53-4V					D			Max Zorn	2 wells

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 46 domestic wells

Site Name Old Bridge Forge
Well Type private 3-4 miles
Date 7-5-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-4Z	3-4				D			John Dietz	
53-5CC					D			Esther Skures	
53-6NN					D			Eugene Schwenk	
53-6WW					D			Archie Born	2 wells D
53-6X					D			Alvin Lange	
53-6Y					D			Fred Wellman	
53-7A					D			Herbert Lehde	4 wells D
53-7B					D			Victor Jozwick	
53-7G					D			Wayne Bice	2 wells D
53-7J					D			W. A. Williamson	
53-7K					D			Pat Jozwick	3 wells D
53-7M					D			Denny Bertdorf	6 wells D
53-7Q					D			Leon Thiel	2 wells D
53-7RR	" "				D			Mike McClennan	
53-7S					D			Christine Roger	
53-7T					D			Vince Pendergast	2 wells D
53-8AA					D			O'Donnell Ranch	2 wells D
53-8AAA					D			T. V. Erickson	
53-8BB					D			Harry Born	4 wells D
53-8BBB					D			C. Buergner	
53-8CCC					D			A. Lawrence	
53-8DD					D			H. C. Sander	2 wells D
53-8DDD					D			T. Landroth	
53-8EEE	↓				D			L. Durocher	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page total 41 domestic wells

10

Site Name Old Bossier Forge
Well Type Water supply wells
Date 3-6-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-8FF	3-4				D			T. Snow	2 wells D
53-8GG					D			J. Adams	
53-8GGG					D			J. Zorn	
53-8H					D			L. Felder	2 wells D
53-8HH					D			W. Seidel	2 wells D
53-8HHH					D			L. Ullrich	
53-8J					D			M. Schultz	5 wells D
53-8JJ					D			L. Woffenbert	4 wells D
53-8JJJ					D			L. Landgraft	2 wells D
53-8LL					D			J. Lieman	2 wells D
53-8LLL					D			C. Buerger	
53-8MM					D			H. Naumann	2 wells D
53-8MMM					D			L. Betts	
53-8QQ	"				D			D. Fritz	5 wells D
53-8RR					D			L. Demuth	
53-8TT					D			J. Schroeder	3 wells D
53-8UU					D			Sandy Creek B.C.	2 wells D
53-8V					D			R. Schultz	2 wells D
53-8WW					D			D. Riley	
53-8YY					D			W.A. Anderson	
53-8Z					D			J. Boeker	
53-8ZZ					D			R. Wagner	3 wells D
53-9B					D			Jim Evans	2 wells D
53-9BC					D			Delbert Hagemeyer	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 47 domestic wells

Site Name Old Bronze Forge
Well Type plotted 3-4 miles
Date 3-6-95

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
53-9CC	3-4				D			C. of Christ	
53-9E					D			K. Giles	2 wells D
53-9EE					D			Huermann Print Shop	
53-9G					D			C. Dierking	2 wells D
53-9J					D			F. Eckert	3 wells D
53-9L					D			Huermann Printshop	6 wells D
53-9M					D			W. L. Kellogg	2 wells D
53-9N					D			M. Nunn	2 wells D
53-9P					D			A. Wehmeyer	2 wells D
53-9Q					D			E. Rodenbeck	
53-9R					D			L. Thomas	3 wells D
53-9S					D			C. Sommer	
53-9T					D			M. Hueske	
53-9Y					D			H. Luedemann	
53-9Z					D			L. Lehmann	
54-1CC					D			W. F. Booker	2 wells D
54-1J					D			Ben. Boehnke	2 wells D
54-1L					D			Ted Sager	2 wells D
54-4BB					D			A. Bilski	2 wells D
54-4BBB					D			E. O'Berlin	
54-4CC					D			O. Seiss	3 wells D
54-4CCC					D			Green	
54-4DD					D			R. A. Schave	
54-4FF	↓				D			S. Rybarski	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page total 44 domestic wells

(12)

Site Name Old Brazos Force

Well Type Plotted 3-4 mile

Date 3-6-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner	
54-4FFF	3-4				D			S. Bilski	
54-4G					D			L. Giebel	2 wells D
54-4GG					D			W. Schewe	
54-4GGG					D			K. [illegible]	
54-4J					D			A. Gick	2 wells D
54-4JJ					D			K. Hafner	
54-4L					D			B. White	3 wells D
54-4LL					D			W. H. Vesper	
54-4M					D			R. Daniels	
54-4MM					D			O. Baker	
54-4N					D			Brenham C.C.	
54-4P					D			H.D. McIntyre	
54-4PP					D			D. Kelly	
54-4Q	" "				D			J. Landau	2 wells D
54-4SS					D			J. Kettler	3 wells D
54-4U					D			C. R. Moody	
54-4UU					D			J. Kajiura	
54-4VV					D			J. Roberts	2 wells D
54-4XX					D			O. Adler	
54-4Y					D			L. Landgraf	2 wells D
54-4YY					D			F. Woodford	
54-7A					D			Cleaner's Hangar	
54-7C					D			G. Arnold	3 wells D
54-7F					D			A. Seenburg	

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page totals 35 domestic wells

Site Name Old Brazes Forge
Well Type Plotted 3-4 miles
Date 3-6-96

Number	Miles	TD	SWL	Screened Interval	Type	Date Installed	Aquifer	Owner
54-7KK	3-4				D			V. Mazurkiewicz
54-7SS					D			Cleaners Hangers
54-7X					D			Wash. Co. Tractor Co
54-7Y					D			K. Krueger
	end 3-4							

Type: D - Domestic, PS - Public Supply, I - Industrial, Irr - Irrigation, T - Test, O - Other

page total 4 Domestic wells

3-4 mile totals 255 domestic wells

Old Brazos Forge

Water Wells

Plotted

0 - .25 2 wells indicated on map - no logs

.25 - .5 9 domestic wells

.5 - 1 10 domestic wells

1 - 2 102 domestic wells 1 Public supply

2 - 3 81 domestic, 1 industrial

3 - 4 miles 255 domestic wells

<u>Located wells</u>

0 - .25 1 Industrial

.25 - .5 No located wells indicated

.5 - 1 1 Irrigation

1 - 2 3 Domestic, 3 Pub Supply, 5 Industrial, 2 unknown use

2 - 3 3 Domestic, 8 Public Supply, 1 Industrial, 2 unknown use

3 - 4 11 Domestic, 3 Public Supply, 1 Irrigation, 1 Industrial, 9 unknown use

Total wells

0 - .25 2 possible

.25 - .5 9 domestic wells

.5 - 1 10 domestic, 1 irrigation

1 - 2 105 domestic wells, 4 Public Supply 2 unknown

2 - 3 84 domestic, 9 Public Supply, 2 Industrial 2 unknown

3 - 4 266 domestic 3 Public Supply, 1 Irrigation, 1 Industrial 9 un.

Old Brazos Forge Well O.M. Indust.
+.d 292 264-284

WRD Exp. (GW)
April 1966

Well No. YY 59-53-501 150'

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

1:24,000

MASTER CARD

Record by: W. SANDEEN — Source of data: D.M WILDER — Date: 7-29-68 — Map: BRENHAM 1963

State: TEXAS [48] — County (or town): WASHINGTON [YY]

Latitude: 30 10 51 N — Longitude: 096 25 09 — Sequential number: 1

Lat-long accuracy: — T S, R W, Sec — B & M

Local well number: YY-59-53-501 — Other number:

Local use: — Owner or name: THE OLD BRAZOS FORGE

Owner or name: BRAZOS FORGE — Address: PO BOX 140 BRENHAM 77833

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — N

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — N

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. — W

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: [N] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: 7-23-68 [O] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD — Depth well: 292 ft [292] Meas. Rep. DRL accuracy [3]

Depth cased: (first perf.) 264 ft [264] Casing type: STEEL; Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — S

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: NOV 1964 [964] Pump intake setting: 216 ft [216]

Driller: name B... Iron Works address BRENHAM

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — S — Deep / Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 1 — T — Trans. or meter no.

Descrip. MP — ft above below LSD, Alt. MP

Alt. LSD: 355 [355] Accuracy: (source) [4]

Water Level: Rpt 150 ft above below MP; Ft above below LSD [150] Accuracy: [G]

Date meas: 11-64 [N64] Yield: gpm [ ] Method determined [ ]

Drawdown: ft [ ] Accuracy: [ ] Pumping period hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10⁶ [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

Well No. YY 59-53-501

Latitude-longitude 30 10 51 0 96 25 09
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: 03 | Section:

F | Drainage Basin: 523 | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — H

MAJOR AQUIFER: system, series — TM — aquifer, formation, group — J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 20 ft — 20 — Depth to top of: ft — 264

MINOR AQUIFER: system, series — aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft — Depth to top of: ft

Intervals Screened: 264-284

Depth to consolidated rock: ft — Source of data:

Depth to basement: ft — Source of data:

Surficial material: — Infiltration characteristics:

Coefficient Trans: gpd/ft — Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas State Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE-GW ONLY

Program No. ______
Proj. No. ______

CHEMICAL WATER ANALYSIS REPORT

County YY WASHINGTON
State Well No. 59-53-501
Well No. ______
Date Collected 07-29-68
By ______

Send report to:

Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

Location Brenham Bypass
Source (type of well) ______ Owner D. M. Wilder
Date Drilled 1964 Depth 292 ft. WBF ______
Producing intervals ______ Water level ______ ft.
Sampled after pumping ______ hrs. Yield ______ GPM meas./est. Temperature ______ °F ______ °C
Point of collection ______ Appearance ☒ clear ☐ turbid ☐ colored ☐ other
Use PS Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

	MG/L	ME/L
Silica	42	
Calcium	97	
Magnesium	4	
Sodium	28	
Total		
☐ Potassium	3.0	
☐ Manganese		
☐ Boron		
3/ ☐ Total Iron		

%Na 19
SAR 0.8
RSC 0.13

☐ (other) ______ MG/L

Specific Conductance (micromhos/cm^3) 599

Diluted Conductance (micromhos/cm^3) ____X____

"☐" items will be analyzed if checked.

	MG/L	ME/L
Carbonate		
Bicarbonate	324	
Sulfate	16	
Chloride	29	
Fluoride	0.3	
Nitrate	0.1	
pH	7.6	
Total		

1/ Dissolved Solids (sum in MG/L)	379
Phenolphthalein Alkalinity as $CaCO_3$	
Total Alkalinity as $CaCO_3$	
Total Hardness as $CaCO_3$	259

2/ Nitrogen Cycle

Ammonia - N	
Nitrite - N	
Nitrate - N	
Organic Nitrogen	

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total Iron requires separate sample.

TWDBE-GW-50 (Rev. 7-1-71)

Analyst ______ Checked By ______

[redacted] [redacted] PO Box 140 [redacted] [redacted] [redacted] [redacted] Ground Water Analysis [redacted] [redacted] [redacted] [redacted] [redacted] Water Resources Aust[redacted]xas

Fe + °C

State: Texas | 4 9 | Brenham, Texas 77833 | County: Washington | Y Y | Well No. | Latitude 3 0 1 0 5 1 N | Longitude 9 6 2 5 0 9 | Seq. No. 1 | Date M D Y 0 7 2 9 6 8 | Sampling Depth | Type

Local Well No. YY 59-53-501 Location Brenham Bypass

KEY PUNCHED

Owner: D.M.Wilder Date drilled: 1964 Depth 292 WBF Prod. intervals 264-292 Water level UTM

Sampled after pumping 30 min. Yield 40 GPM Pt. of coll. hydrant at plant Appearance clear Use Public Supply Collector W. Sandeen

Constituent	Entries	mg/l	me/l
K x 10^6	R KCl 335 R sample 559	549	
pH		7.6	
Temperature °C			
Density at 20°C			
SiO_2	5 ml; % sample 42.2	42	
Al	A 0.00250 mg; .00625 mg; .0125 mg; .025 mg; Sample		
Fe	A 0.025 mg; 25 ml .000 Sample Total .00 mg/l; ml Sample Diss. mg/l		
Na	Total mg/l; Dissolved mg/l		
Ca	25 ml; 4.85	97	4.84
Mg	4.1	41	.34
Na	28.1	28	1.22
Na + K Calc.			
K	2.0 ml nacl added; 2.50 X 1.200	3.0	.08
Percent error .0.0	Total cations		6.48

Constituent	Entries	mg/l	me/l
HCO_3	25 ml; 8.10; Total Alk as CO_3 159	324	5.31
CO_3	25 ml	0	.00
SO_4	10 ml; Blk; Std; Sample .81	16	.33
Cl	50 ml; 2.89	29	.82
Source 79	Card No. 80 [0]		
F	10 ml; A 1.00 mg/l; 2.00 mg/l; A sample .339	.3	.02
NO_3	ml std. 10 ml; A sample .09; A ml std; A ml std Factor	1	.00
NO_2	ml mg/l; A 0.01 mg; .02 mg; .05 mg; Sample		
PO_4	ml Ortho Total; A 0.0050 mg; .0100 mg; .0250 mg; .0500 mg; Sample		
Total anions			6.48

Milliequivalents per liter

Na+K ——— Cl
Ca ——— HCO_3+CO_3
Mg ——— SO_4

Constituent	Entries	Value
B	A .063 mg 5 ml; .000285200	.0
Al		
Fe		.00
Mn		
Cu		
Pb		
Zn		
Dissolved solids: Determined		
Dissolved solids: Calculated		37
Hardness	ml; me/l Ca + Mg 5.18; me/l Alk 5.31; me/l NCH —	Ca+Mg 25; NCH
Color		5
Br		
I		
Alk. as $CaCO_3$		
Free CO_2		
Percent Na	19	
SAR		.8
RSC		.1
MBAS		
NO_2		

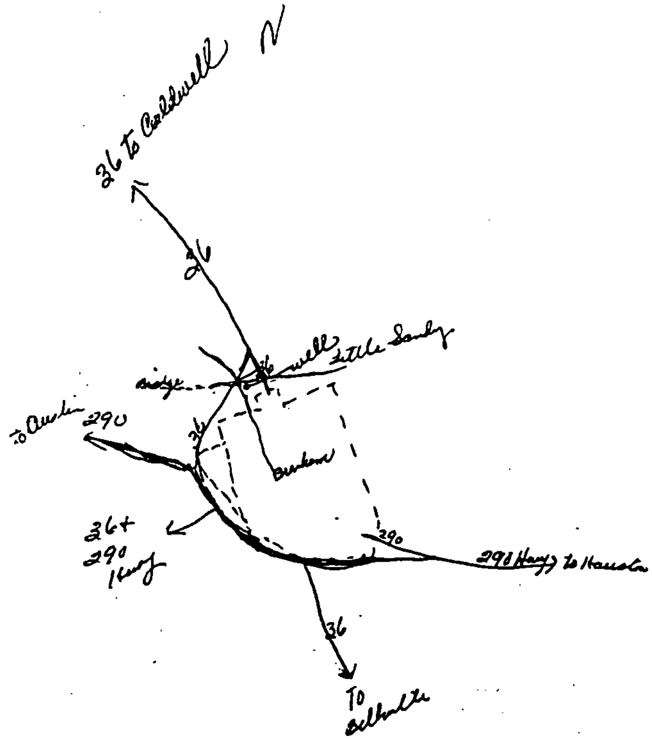
Card No.

Analyst J. L. WASHINGTON Checked by WILLARD J.
Date begun SEP 5 - 1968 Completed SEP 3 0 1968

Transmittals	Date
Records processing	OCT 2 1 1968
Collector	
Owner X	OCT

1101

Recorded by: Punched by: Date:



1/8 mile from Creek bridge

6P GW 7

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No.
Located on map
Received:
Form GW 8
Form GW 9

1) OWNER:
Person having well drilled: Clyde Geick (Name) Address 603 Carolyn, Brenham, Texas (Street or RFD) (City) (State)

Landowner " (Name) Address Route 4, Brenham, Texas (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington Labor League Abstract No.

NW¼ NE¼ SW¼ SE¼ of Section Block No. Survey
(Circle as many as are known)

miles in (NE, SW, etc.) direction from (Town)

NORTH

Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well ☒ Deepening ☐ Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check):
Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check):
Rotary ☒ Driven ☐ Dug ☐ Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 251 ft. Depth of completed well 251 ft. Date drilled 9-10-68
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	50	sand and clay			
50	90	sandy shale			
90	170	shale			
170	187	rock and shale			
187	238	rock			
238	250	sand and rock			
250	251	Blue shale			

(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall ☐ Gravel packed ☒ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level 100 ft. below land surface Date 9-10-68
Artesian pressure ___ lbs. per square inch Date

9) CASING:
Type: old ☐ New ☒ Steel ☒ Plastic ☐ Other ☐
Cemented from ___ ft. to ___ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4"	0	232	.237

10) SCREEN:
Type
Perforated ☐ Slotted ☒

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
2"	221	251	.030

11) WELL TESTS: Well blew 1800 gph
Was a pump test made? ☐ Yes ☐ No If yes by whom?
Pomykal Drilling Company
Yield: ___ gpm with ___ ft. drawdown after ___ hrs
Bailer test ___ gpm with ___ ft. drawdown after ___ hrs
Artesian flow ___ gpm Date
Temperature of water
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? ___ depth of strata

12) PUMP DATA:
Manufacturer's Name Sta-Rite
Type Submersible H.P. 3/4
Designed pumping rate 700 gpm ☐ gph ☒
Type power unit Elect.
Depth to bowls, cylinder, jet, etc., 168 ft. below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Verde Pomykal (Type or Print) Water Well Drillers Registration No. 191

Address ~~Route 3, Box 424-A~~, Brenham, Texas, 77833 P.O. Box 672 (Street or RFD) (City) (State)

(Signed) Verde Pomykal (Water Well Driller) Pomykal Drilling Company (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

Please use black ink.
Send original copy by certified mail to the Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

1) OWNER Robert Call (Name) Address ________ (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL:
County Washington ________ miles in ________ (N.E., S.W., etc.) direction from ________ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ________ Block No. ________ Township ________
Abstract No. ________ Survey Name ________
Distance and direction from two intersecting section or survey lines ________

☒ See attached map. # 2 Map on 59-52-7X

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ________

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ________

6) WELL LOG:
Date drilled 8-14=84

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/2	Surface	202
3 7/8	202	291

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☐ Other telescope
If Gravel Packed give interval . . . from ________ ft. to ________ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	1	top soil
1	25	sand & rocks
25	42	streaky sand
42	60	sand
60	202	shale
202	222	streaky sand
222	242	soapstone
242	264	soapstone
264	285	streaky sand
285	291	shale

(Use reverse side if necessary)

RECEIVED
JAN 11 1985
DEPT. OF WATER RESOURCES

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4	N	pvc well casing	0	202	
2 1/2	N	pvc pipe	191	246	
2 1/2	N	pvc screen	246	286	
2 1/2	N	pvc pipe	286	291	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 202 ft.
________ ft. to ________ ft.
Method used pressure
Cemented by Siegert Water Wells, Inc.

10) SURFACE COMPLETION
☒ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 135 ft. below land surface Date 8-14-84
Artesian flow ________ gpm. Date ________

12) PACKERS: Type Depth
K packer
Shirt tail packer

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ________
Depth to pump bowls, cylinder, jet, etc., ________ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 7 gpm with 43 ft. drawdown after 2 hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? good Depth of strata 242-291
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Siegert Water Wells, Inc. (Type or Print) Water Well Driller's License No. 2230

ADDRESS Rt. 5 Box 728 (Street or RFD) Bryan (City) Texas (State) 77803 (Zip)

(Signed) Ricky J Siegert (Licensed Water Well Driller) (Signed) ________ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 59-53-6P
Located on map Yes DLF

DEPARTMENT OF WATER RESOURCES COPY

TDWR 0392 (12/20/83)

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the department, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a department copy, shall include the name, mailing address, and telephone number of the Board and the department. The well log required herein shall at the request in writing to the department, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

Please use black ink.
Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board
P. O. Box 13087
Austin, Texas 78711

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

1) OWNER Kenneth Blum (Name) Address 905 Top Hill Dr. (Street or RFD) Brenham, (City) Tx. (State) 77833 (Zip)

2) LOCATION OF WELL:
County Washington 0 miles in N. (N.E., S.W., etc.) direction from Brenham (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☒ See attached map. Map on 59-51-6R

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled 8-16-84

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4"	Surface	90

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from 70 ft. to 90 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	3	Black
3	8	shale
8	26	rock + shale
26	31	coarse sand
31	70	rock + shale
70	77	rock
77	89	coarse sand
89	90	shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4"	N	PVC casing	0	70	
4"	N	PVC screen	70	90	

9) CEMENTING DATA [Rule 319.44(b)]
Cemented from 0 ft. to 10 ft.
______ ft. to ______ ft.
Method used ______
Cemented by Pomykal Drilling Co.

10) SURFACE COMPLETION
☐ Specified Surface Slab Installed [Rule 319.44(c)]
☐ Pitless Adapter Used [Rule 319.44(d)]
☐ Approved Alternative Procedure Used [Rule 319.71]

11) WATER LEVEL:
Static level 59 ft. below land surface Date ______
Artesian flow ______ gpm. Date ______

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JAN 10 1985
DEPT. OF WATER RESOURCES

12) PACKERS: Type Depth

13) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

14) WELL TESTS:
Type Test: ☐ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 20 gpm with ______ ft. drawdown after ______ hrs.

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 12 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME Pomykal Drilling Co. (Type or Print) Water Well Driller's License No. 2301

ADDRESS P.O. Box 672 (Street or RFD) Brenham, (City) Texas (State) 77833 (Zip)

(Signed) Thomas D Bibbi (Licensed Water Well Driller) (Signed) ______ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TDWR use only
Well No. 59-51-6R
Located on map Yes DLF

DEPARTMENT OF WATER RESOURCES COPY

TDWR 0392 (12/29/83)

6-2
.25-.5
50'
70-90'
59'
1984

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Driller's Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every licensed water well driller drilling, deepening or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within 30 days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the department, and the owner thereof or the person having had such well drilled. Each copy of a well log, other than a department copy, shall include the name, mailing address, and telephone number of the Board and the department. The well log required herein shall at the request in writing to the department, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential.

GW 7

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711	State of Texas WATER WELL REPORT	For TWDB use only Well No. 66 Located on map Received: Form GW 8 Form GW 9

25-5

293'

256-293

49

1) OWNER:
Person having well drilled Ervin Lueck (Name) Address Rt 4 (Street or RFD) Brenham (City) Texas (State)

Landowner Same (Name) Address Same (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington Labor ______ League ______ Abstract No. ______

NW¼ NE¼ SW¼ SE¼ of Section ______ Block No. ______ Survey ______
(Circle as many as are known)

miles in ______ (NE, SW, etc) direction from ______ (Town)

NORTH

Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well [X] Deepening [ ]
Reconditioning [ ] Plugging [ ]

4) PROPOSED USE (Check):
Domestic [X] Industrial [ ] Municipal [ ]
Irrigation [ ] Test Well [ ] Other [ ]

5) TYPE OF WELL (Check):
Rotary [X] Driven [ ] Dug [ ]
Cable [ ] Jetted [ ] Bored [ ]

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 298 ft. Depth of completed well 298 ft. Date drilled 3/28/68

All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	29	shale	205	263	shale
29	40	sand	263	282	sand rock
40	50	shale + rock	282	292	sand
50	124	shale	292	298	hard sand
124	134	rock + shale			
134	152	shale			
152	194	rock hard			
194	205	rock soft			(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall [ ] Gravel packed [X] Other [ ]
Under reamed [ ] Open hole [ ]

8) WATER LEVEL:
Static level 48 ft. below land surface Date 3/28/68
Artesian pressure ______ lbs. per square inch Date ______

9) CASING:
Type: old [ ] New [ ] Steel [ ] Plastic [ ] Other [ ]
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4"	0	278	.237

10) SCREEN:
Type ______
Perforated [ ] Slotted [X]

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
2"	256	298	.060

11) WELL TESTS: Well blew 75 gpm
Was a pump test made? [ ] Yes [ ] No If yes by whom? ______
Yield: ______ gpm with ______ ft. drawdown after ______ hrs
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs
Artesian flow ______ gpm Date ______
Temperature of water ______
Was a chemical analysis made? [ ] Yes [ ] No
Did any strata contain undesirable water? [ ] Yes [ ] No
Type of water? ______ depth of strata ______

12) PUMP DATA:
Manufacturer's Name Sta Rite
Type Jet H.P. ½
Designed pumping rate ______ gpm [ ] gph [ ]
Type power unit ______
Depth to bowls, cylinder, jet, etc., ______ ft. below land surface.

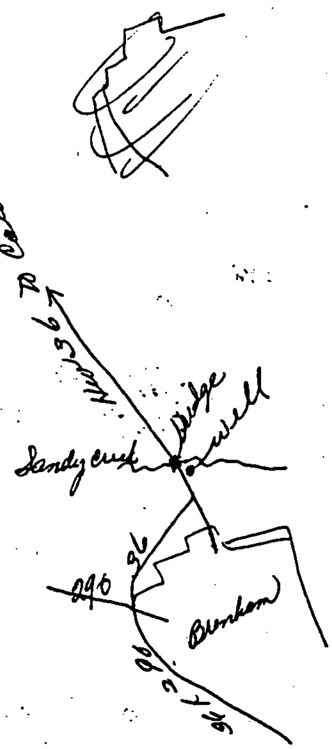
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Roger Pomykal (Type or Print) Water Well Drillers Registration No. 190

Address Route 3, Box 424-B (Street or RFD) Brenham (City) Texas (State)

(Signed) Roger Pomykal (Water Well Driller) Pomykal Drilling Co (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.



well is about 1/10 of a mile from Sandy creek bridge

62

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas WATER WELL REPORT

For TDWR use only
Well No. 59-61-62
Located on map
Received:

1) OWNER Billy Jasinski (Name) Address Brenham Texas 77833 (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL:
County Washington ___ miles in ___ (N.E., S.W., etc.) direction from ___ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form. 5

☐ Legal description:
Section No. ___ Block No. ___ Township ___
Abstract No. ___ Survey Name ___
Distance and direction from two intersecting section or survey lines ___
#3
☑ See attached map. 59-61-4?

3) TYPE OF WORK (Check):
☑ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☑ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other ___

5) DRILLING METHOD (Check):
☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ___

6) WELL LOG:
Date drilled 7/6/78

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	295

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☑ Gravel Packed ☐ Other ___
If Gravel Packed give interval . . . from ___ ft. to ___ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	4	black top soil
4	8	shale
8	30	rock & sand
30	54	shale
54	65	rock & sand
65	82	shale
82	117	rock & shale & sand
117	195	shale
195	251	hd rk & streaks shale
251	293	soft rock & sand
293	295	shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	galv steel	0	267	237
2	N	" "	253	295	.060

CEMENTING DATA
Cemented from ___ ft. to ___ ft.
Method used ___
Cemented by ___ (Company or Individual)

9) WATER LEVEL:
Static level 96 ft. below land surface Date 7/6/78
Artesian flow ___ gpm. Date ___

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbin ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ___
Depth to pump bowls, cylinder, jet, etc., ___ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 75 gpm with ___ ft. drawdown after ___ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ___ Depth of strata ___
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Charles Konieczny (Type or Print) Water Well Drillers Registration No. 1660

ADDRESS P.O. Box 672 (Street or RFD) Brenham (City) Texas (State) 77833 (Zip)

(Signed) Charles Konieczny (Water Well Driller) Pomykal Drilling Co (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TDWR-0392

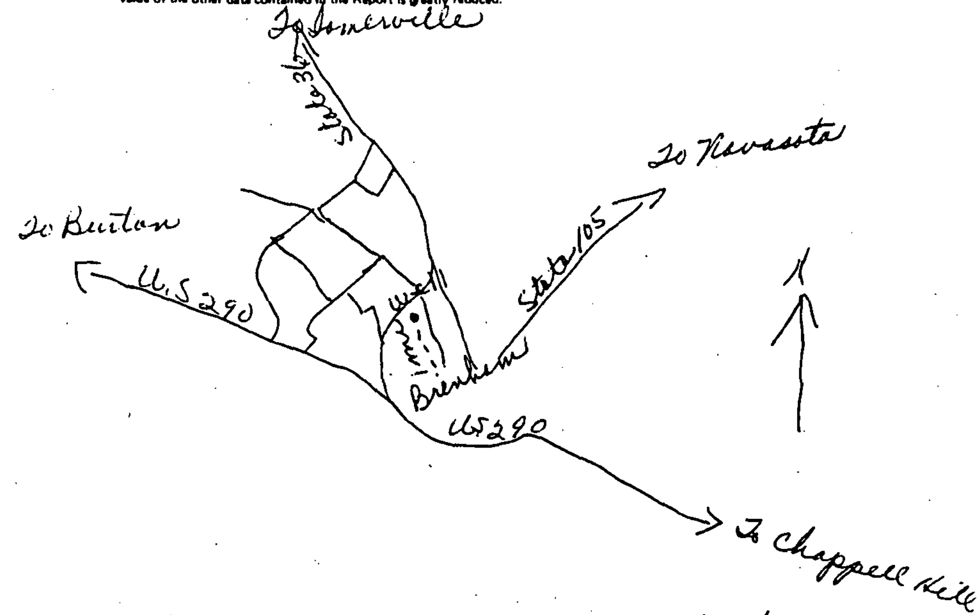
2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area, e.g. survey abstract.

Information furnished in Section 2 of the TDWR-0392 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Well is located 1 mile west of Brenham, Washington Co.

RECEIVED
JAN 8 1979
Central Records
Texas Dept. of Water Resources

RECEIVED
JUL 10 1978
DEPT. OF WATER RESOURCES

6Z DUP

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

For TDWR use only
Well No. 59-53-62
Located on map YES
Received: TH

1) OWNER Bill Tomschefsky (Name) Address Brenham Texas (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL: *
County Washington ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☑ See attached map. #12 Map on 59-53-22

3) TYPE OF WORK (Check): ☑ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☑ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled 10-25-79

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	268

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☑ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from ______ ft. to ______ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	3	black top soil
3	14	sand + rock
14	34	sandy shale + rock
34	42	sand + rock
42	51	sandy shale + rock
51	81	sand + rock
81	83	rock
83	105	shale + rock
105	189	shale
189	200	hard rock
200	212	shale
212	254	rock hard
254	268	soft rock w/ hd strks quit on hard rock

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	galv. steel	0	253	.237
2	N	" "	244	268	.060

CEMENTING DATA

Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or Individual)

9) WATER LEVEL:
Static level 109 ft. below land surface Date 10-25-79
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbin ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 50 gpm with ______ ft. drawdown after ______ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Terry Oertli (Type or Print) Water Well Drillers Registration No. 1926

ADDRESS P.O. Box 672 (Street or RFD) Brenham (City) Texas (State) 77833 (Zip)

(Signed) Terry Oertli (Water Well Driller) Pomykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TDWR 0392

2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area, e.g. survey abstract.

Information furnished in Section 2 of the TDWR-0392 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

Texas Water Well Drillers Board P. O. Box 13087 Austin, Texas 78711

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

1) OWNER Robert Scheel (Name) Address Rt. 6 Box 6040 - Brenham, Tx. 77833 (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL: MAP #13, LOC #11
County Washington ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☑ See attached map. map on 59-53-1FF

3) TYPE OF WORK (Check): ☑ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☑ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled 7-1-83

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	82

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☑ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from ______ ft. to ______ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	25	top soil sand
25	32	shale & rock
32	38	sand
38	50	rock & shale
50	76	sand & rock
76	82	shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4	N	PVC Casing	0	62	
4	N	PVC screen	62	82	

CEMENTING DATA

Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or Individual)

9) WATER LEVEL:
Static level 57 ft. below land surface Date ______
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

RECEIVED
SEP 3 1984
DEPT. OF WATER RESOURCES

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☑ No

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 8-10 gpm with in loads ______ ft. drawdown after ______ hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

COMPANY NAME POMYKAL DRILLING CO. (Type or Print) Water Well Driller's License No. 2301

ADDRESS P.O. BOX 672 BRENHAM, TEXAS 77833 (Street or RFD) (City) (State) (Zip)

(Signed) Thomas Gibbs (Licensed Water Well Driller) (Signed) ______ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

For TOWR use only Well No. 59-53-62 Located on map yes C.F.S.

TOWR 0392 (Rev. 5 27 82) DEPARTMENT OF WATER RESOURCES COPY

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).

62

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 12386
Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 59-?-?-62
Located on map ______
Received: ______

.25

1) OWNER:
Person having well drilled Charles Schulte (Name) Address 1301 Woodson Lane, Brenham, Tx (Street or RFD) (City) (State)
Landowner Same (Name) Address Rt 4 Brenham (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington, ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*

North

(Use reverse side if necessary)

or

Give legal location with distances and directions from adjacent sections or survey lines.
Labor ______ League ______
Block ______ Survey ______
Abstract No. ______
(NW¼ NE¼ SW¼ SE¼) of Section ______

3) TYPE OF WORK (Check): New Well ✓ Deepening Reconditioning Plugging

4) PROPOSED USE (Check): Domestic ✓ Industrial Municipal Irrigation Test Well Other

5) TYPE OF WELL (Check): Rotary ✓ Driven Dug Cable Jetted Bored

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 276 ft. Depth of completed well 276 ft. Date drilled 2/18/72
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	10	clay	206	227	rock
10	18	sand	227	235	shale
18	25	shale	235	243	rock
25	100	sand & rk	243	249	shale
100	166	shale	249	268	rock
166	169	rock	268	272	soft rock
169	172	shale	272	276	hard rock
172	175	rock			
175	174	shale			
174	181	rock			
181	200	shale			
200	206	rock & shale			

(Use reverse side if necessary)

9) Casing:
Type: Old New ✓ Steel ✓ Plastic Other
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4	0	249	.237

10) SCREEN:
Type
Perforated Slotted ✓

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot Size
2	234	276	.060

7) COMPLETION (Check):
Straight wall Gravel packed ✓ Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 107 ft. below land surface Date 2/18/72
Artesian pressure ______ lbs. per square inch Date ______
Depth to pump bowls, cylinder, jet, etc., ______ ft. below land surface.

Well blew 3000 g.p.h.

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom?
Yield: ______ gpm with ______ ft. drawdown after ______ hrs.
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs.
Artesian flow ______ gpm
Temperature of water ______

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? ______ depth of strata ______

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Verde Pomykal (Type or Print) Water Well Drillers Registration No. 191

ADDRESS P.O. Box 672 (Street or RFD) Brenham (City) Texas 77833 (State)

(Signed) Verde Pomykal (Water Well Driller) Pomykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDBE-GW-53

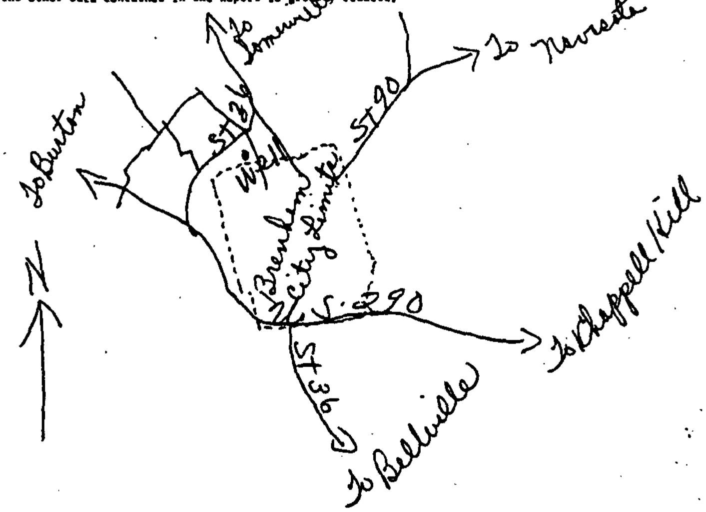
2)LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area. e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-33 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Well is located just northwest of Brenham City Limits Washington Co.

RECEIVED
JUL 13 1972
Central Records
Texas Water Development Board

DUP

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 59-53-62
Located on map yes
Received: C.F.S.

1) OWNER MORRIS FASKE (Name) Address 2008 Carriage Ln-Brenham TX 77833 (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL: County WASHINGTON ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

previously sampled

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☒ See attached map. map 59-46-4JJ

.25 - .5

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled 3-8-82

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	188

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other ______
If Gravel Packed give interval ... from 173 ft. to 188 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	2	top soil sand
2	18	rock
18	34	shale
34	40	rock
40	109	Shale
109	128	Sand
128	172	shale
172	186	Sand
186	188	Shale

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	PVC Casing	0	173	
2	N	PVC Screen	168	188	

CEMENTING DATA
Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ? (Company or Individual)

9) WATER LEVEL:
Static level 58 ft. below land surface Date ______
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

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DEPT. OF
WATER RESOURCES

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☒ No

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 25 gpm with ______ ft. drawdown after ______ hrs.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME CHARLES KONIECZNY (Type or Print) Water Well Drillers Registration No. 1660

ADDRESS P.O. BOX 672 (Street or RFD) BRENHAM, (City) TEXAS (State) 77833 (Zip)

(Signed) Charles Konieczny (Water Well Driller) POMYKAL DRILLING CO. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

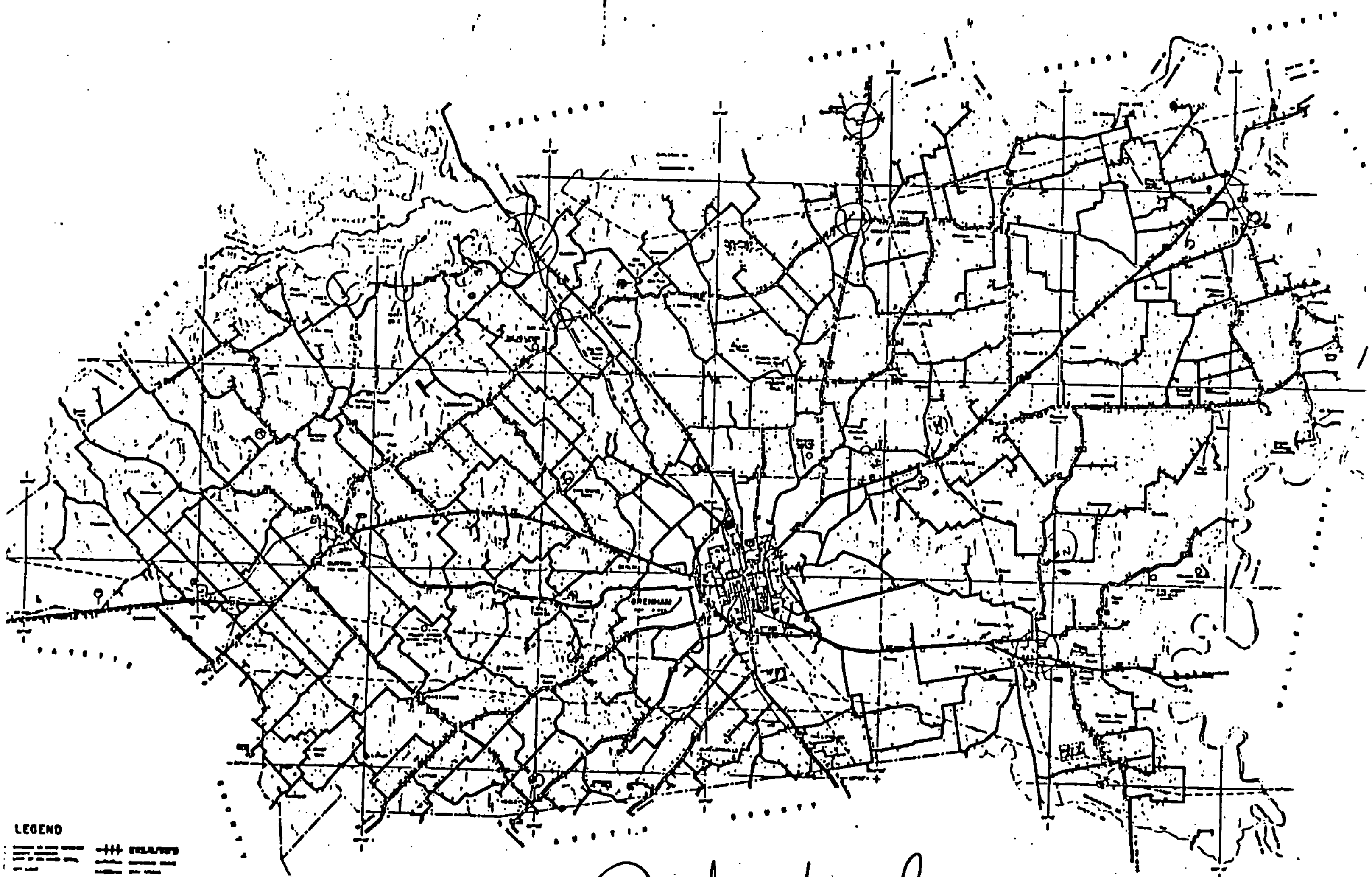
TDWR 0392 (Rev. 1-12-79)

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).



LEGEND

John Horak

GENERAL HIGHWAY MAP

WASHINGTON COUNT

TEXAS

TEXAS STATE HIGHWAY DEPARTMENT
PLANNING AND RESEARCH DIVISION
U.S DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

5-1

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 59 52 5N
Located on map
Received:

1) OWNER:
Person having well drilled Herbert Faske (Name) Address Brenham, Texas (Street or RFD) (City) (State)

Landowner Same (Name) Address Same (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington, ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*

North

(Use reverse side if necessary)

or

Give legal location with distances and directions from adjacent sections or survey lines.

Labor ______ League ______
Block ______ Survey ______
Abstract No. ______
(NW¼ NE¼ SW¼ SE¼) of Section ______

3) TYPE OF WORK (Check):
New Well x Deepening
Reconditioning Plugging

4) PROPOSED USE (Check):
Domestic x Industrial Municipal
Irrigation Test Well Other

5) TYPE OF WELL (Check):
Rotary x Driven Dug
Cable Jetted Bored

6) WELL LOG:
Diameter of hole 6 ½ in. Depth drilled 265 ft. Depth of completed well 265 ft. Date drilled 3/5/71
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	3	top soil
3	14	clay
14	25	sand and rock
25	33	shale
33	48	s.nd
48	50	shale and rock
50	55	sandy shale
55	92	rock and shale
92	172	shale
172	182	rock and shale
182	192	rock
192	226	rock and shale
226	234	soft rock
234	265	rock

(Use reverse side if necessary)

9) Casing:
Type: Old New x Steel x x Plastic Other
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4	0	237	.237

10) SCREEN:
Type ______
Perforated Slotted x

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot Size
2	223	265	.060

7) COMPLETION (Check):
Straight wall Gravel packed x Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 85 ft. below land surface Date 3/5/71
Artesian pressure ______ lbs. per square inch Date ______
Depth to pump bowls, cylinder, jet, etc., ______ ft. below land surface.

Well blew 50 g/p/m

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom? ______
Yield: ______ gpm with ______ ft. drawdown after ______ hrs.
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs.
Artesian flow ______ gpm
Temperature of water ______

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? ______ depth of strata ______

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Roger Pomykal (Type or Print) Water Well Drillers Registration No. 190

ADDRESS P.O. Box 672, Brenham, Texas (Street or RFD) (City) (State)

(Signed) Roger Pomykal (Water Well Driller) Pomykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDBE-GW-53

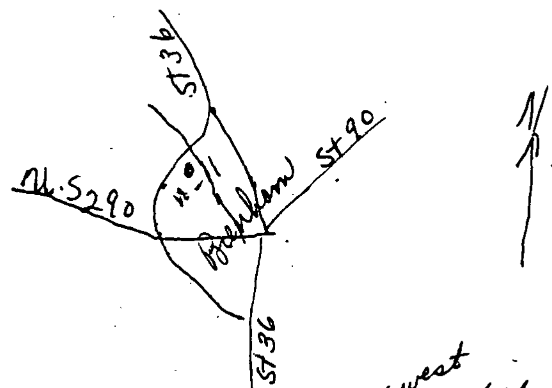
2)LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area. e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-33 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Well is located northwest part of Brenham. Washington Co.

RECEIVED
MAY 13 1971
Central Records
Texas Water Development Board

RECEIVED
APR 27 1971
TEXAS WATER
DEVELOPMENT BOARD

6E

File original copy with Texas Water Development Board P. O. Box 12386, Capitol Station Austin, Texas 78711	State of Texas **DRILLERS LOG AND WELL DATA REPORT**	For use by TWDB only Well No. [illegible] Located on map [illegible] By [illegible] Date [illegible] Map no.

1) Well Owner: [illegible] Hamilton, [illegible] West Main St., [illegible], Texas
Name / Street or RFD / City / State

2) Land Owner:
Name / Street or RFD / City / State

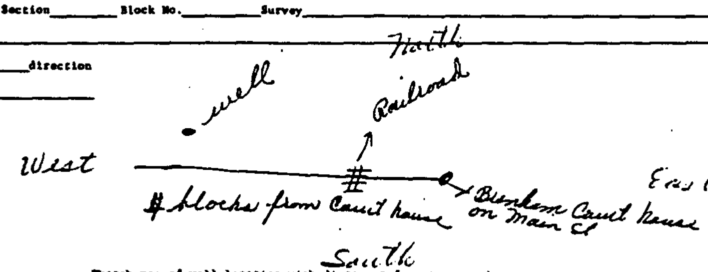
3) Intended use: Industrial ☐ Municipal ☐ Irrigation ☐ Other [illegible] water [illegible]

4) Location of well: County Washington Labor ______ League ______ Abstract No. ______

NW¼ NE¼ SW¼ SE¼ of Section ______ Block No. ______ Survey ______
(Circle as many as are known)

______ miles in ______ direction
NE, SW, etc.

from ______
Town



Sketch map of well location with distances from two section or survey lines, and to landmarks, roads, and creeks.

DRILLERS LOG OF WELL

Method of drilling: rotary Diameter of hole [illegible]" in. Date drilled [illegible]

All measurements made from 0 ft. above ground level.

From (ft)	To (ft)	Description and color of formation material	From (ft)	To (ft)	Description and color of formation material
0	[illegible]	clay			
[illegible]	[illegible]	shale			
[illegible]	70	rock			
70	7[illegible]	sand			
7[illegible]	7[illegible]	rock			
7[illegible]	1[illegible]	sand			
1[illegible]	1[illegible]7	shale			

(Use continuation sheets if necessary)

COMPLETION DATA

COMPLETION

Straight wall ☐
Under reamed ☐
Gravel packed ☒
Open hole ☐
Other ______

CASING

Type: Old ☐ New ☐
Cemented from ______ ft.
to ______ ft.

Diameter (inches)	Setting from (ft)	Setting to (ft)
4"	0	[illegible]

SCREEN

Type ______
Perforated ☐ Slotted ☐

Diameter (inches)	Setting from (ft)	Setting to (ft)
[illegible]"		

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

Verde Pomykal (Driller) Pomykal Drilling [illegible] (Company Name) Reg. No. [illegible]

Please attach electric log, chemical analysis, and other pertinent information if available.

If well was tested by your company or if you installed the permanent pump please complete the following:

WATER LEVEL AND PUMP DATA

Static water level [illegible]
ft. below [illegible] level

Pumping level feet	hours	gpm
[illegible]	[illegible]	

Pump type [illegible]
Designed pumping rate ______ gpm ☐ gph ☐
Type power unit [illegible]
Horsepower [illegible]
Depth to bowls, cylinder, jet, etc., ______ ft. below pump base.

Name of contractor [redacted] installing permanent pump if other than your company:
[illegible]

666

.5.1

Send original copy by certified mail to the Texas Water Development Board
P. O. Box 13087
Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No. 59-53-6G
Located on map yes
Received: 76
[illegible]

1) OWNER:
Person having well drilled M. R. Wirtz (Name) Address La Grange, Texas (Street or RFD) (City) (State)

Landowner Same (Name) Address Brenham Texas (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington, ____ miles in ____ (N.E., S.W., etc.) direction from ____ (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.*

North

(Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.

Labor ____ League ____
Block ____ Survey ____
Abstract No. ____
(NW¼ NE¼ SW¼ SE¼) of Section ____

3) TYPE OF WORK (Check): New Well ✓ Deepening Reconditioning Plugging

4) PROPOSED USE (Check): Domestic ✓ Industrial Municipal Irrigation Test Well Other

5) TYPE OF WELL (Check): Rotary ✓ Driven Dug Cable Jetted Bored

6) WELL LOG:
Diameter of hole 6 1/4 in. Depth drilled 391 ft. Depth of completed well 391 ft. Date drilled 4/2/76
All measurements made from 0 ft. above ground level.

From (ft.) To (ft.)	Description and color of formation material
0-18 clay	266-321 shale
18-25 sand	321-366 rock & shale
25-31 sh & sand stks	366-390 sand
31-48 hd rock & sand	390-391 shale
48-61 shale	
61-107 rock & shale	
107-159 shale	
159-197 rk & hd shale	
197-214 coarse rk-dry	
214-227 shale	
227-248 soft rock & sdy sh	
248-266 hd rock & shale	

(Use reverse side if necessary)

9) Casing:
Type: Old New ✓ Steel ✓ Plastic Other
Cemented from ____ ft. to ____ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4	0	373	.237

10) SCREEN:
Type ____
Perforated Slotted ✓

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot Size
2	349	391	.060

7) COMPLETION (Check):
Straight wall Gravel packed ✓ Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 56 ft. below land surface Date 4/2/76
Artesian pressure ____ lbs. per square inch Date ____
Depth to pump bowls, cylinder, jet, etc., ____ ft. below land surface.

Well blew 100 g.p.m. +

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom?
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.
Bailer test ____ gpm with ____ ft. drawdown after ____ hrs.
Artesian flow ____ gpm
Temperature of water ____

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? ____ depth of strata ____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Arno Jahnke (Type or Print) Water Well Drillers Registration No. 1661

ADDRESS P.O. Box 672 (Street or RFD) Brenham (City) Texas (State)

(Signed) Arno Jahnke (Water Well Driller) Pomykal Drilling Co (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDB WD-4

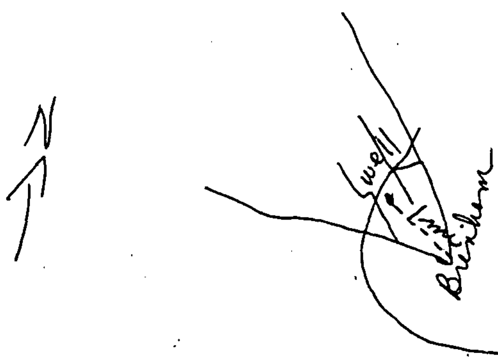
2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area. e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-53 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Well is located 1 mile north of Brenham
Washington Co

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 59-53-6LL
Located on map Yes
Received: C.F.S.

5-1

1) OWNER Jimmy Hahn (Name) Address Brenham, Texas 77833 (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL:
County Washington miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☒ See attached map. #14 map on 59-53-6KK

3) TYPE OF WORK (Check):
☒ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☒ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check):
☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled 7-28-1980

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	263

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☒ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from ______ ft. to ______ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	16	sand
16	18	rock
18	24	rock + sand
24	38	shale
38	42	rock + sand
42	44	shale
44	55	soft rk + sd
55	65	shale
65	93	rock + sdy shale
93	180	shale
180	192	soft rock + strks sdy shale
192	207	shale
207	211	rock + shale
211	253	hard rock
253	260	soft rock
260	263	shale

RECEIVED
APR 15 1982
CR/TC

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	Galv steel	0	240	237
2	N	" "	221	263	060
~~2~~	N				

CEMENTING DATA
Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or Individual)

9) WATER LEVEL:
Static level 103 ft. below land surface Date 7-28-80
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: 30 gpm with ______ ft. drawdown after ______ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☐ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☒ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Charles Konieczny (Type or Print) Water Well Drillers Registration No. 1660

ADDRESS P.O. Box 672 (Street or RFD) Brenham (City) Texas (State) 77833 (Zip)

(Signed) Charles Konieczny (Water Well Driller) Porykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79)

DEPARTMENT OF WATER RESOURCES COPY

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

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> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).

(2)

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only: Well No. 59-53-6[illegible] Located on map: yes Received: KLW

1) OWNER Ernest Ray Bentke (Name) Address 810 Summit Rd Brenham Texas (Street or RFD) (City) (State) (Zip)

2) LOCATION OF WELL: County Washington 1 miles in N (N.E., S.W., etc.) direction from Brenham (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______
(2)
☐ See attached map.

3) TYPE OF WORK (Check): ☑ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☑ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG: Date drilled 7-30-81

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6"	Surface	360

7) BOREHOLE COMPLETION: ☑ Open Hole ☑ Straight Wall ☐ Underreamed ☐ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from ______ ft. to ______ ft.

From (ft.)	To (ft.)	Description and color of formation material
1-3 top soil		
3-5 Red clay		
5-22 White sand		
22-34 White Clay		
34-85 Blue and Brown Clay		
85-130 White and gray clay		
130-171 Blue shale		
171-230 Sand Rock and White gray Water sand		
230-286 Hard gray Chalk		
286-325 Hard gray shale and Rock		
325-360 gray Water sand		

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4	N	Plastic PVC	top	350	SC 40
		15' .012			
		slotted screen			

CEMENTING DATA
Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or Individual)

9) WATER LEVEL:
Static level 47 ft. below land surface Date 7-31-81
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

11) TYPE PUMP: ☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

12) WELL TESTS: Blown
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☑ Estimated
Yield: 70 gpm with ______ ft. drawdown after ______ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☐ No

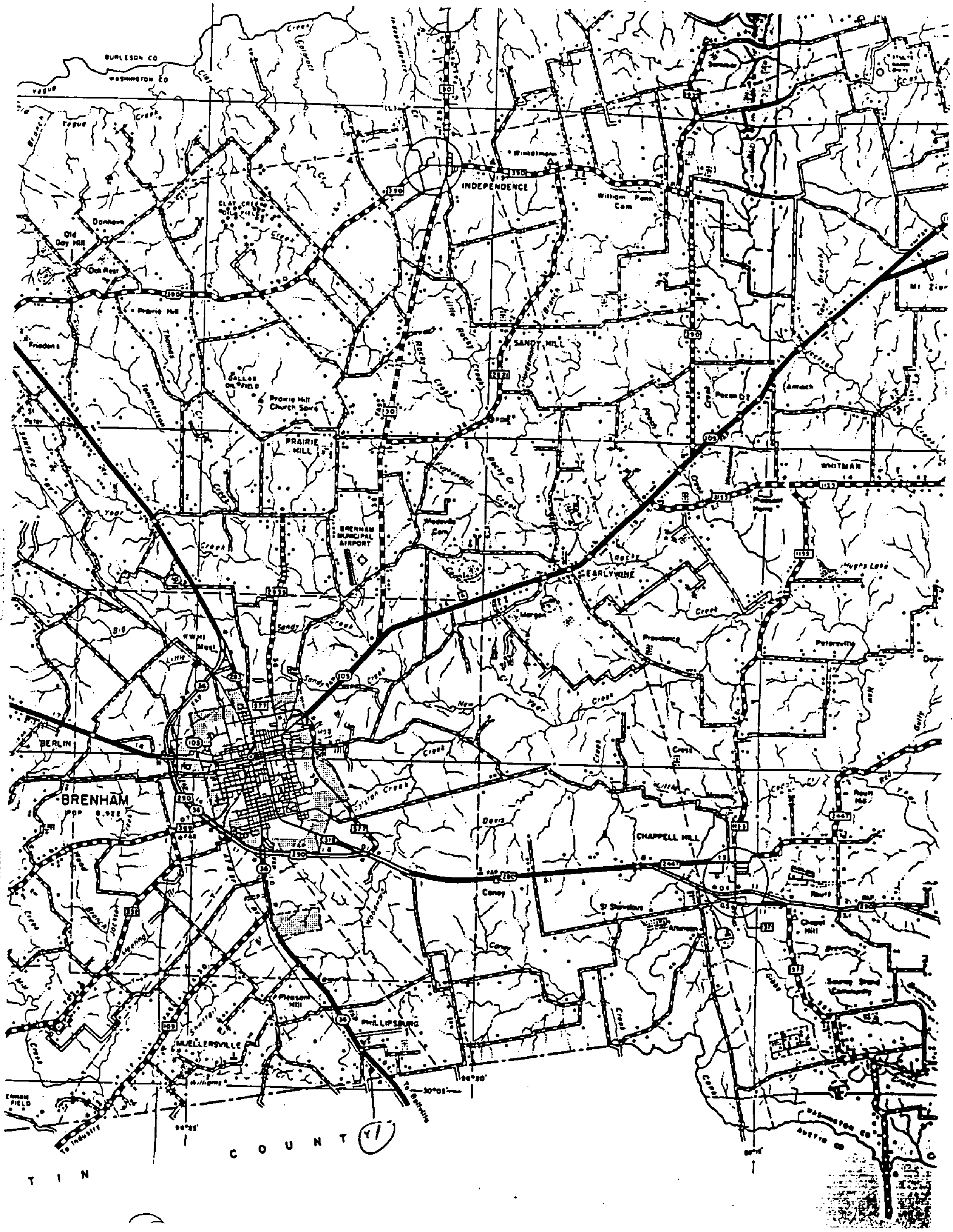
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME A. J. FLENTGE (Type or Print) Water Well Drillers Registration No. 1357

ADDRESS 908 Church St. (Street or RFD) Bellville (City) Texas (State) 77418 (Zip)

(Signed) A. J. Flentge (Water Well Driller) A. J. FLENTGE WELL DRILLING (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.


BURLESON CO
WASHINGTON CO
INDEPENDENCE
William Penn Cem
CLAY CREEK OIL FIELD
Old Gay Hill
Oak Rest
Prairie Hill
Friedens
DALLAS OIL FIELD
Prairie Hill Church Sprs
PRAIRIE HILL
SANDY HILL
Mt Zion
WHITMAN
BRENHAM MUNICIPAL AIRPORT
EARLYWINE
Providence
Petersville
BERLIN
BRENHAM
CHAPPELL HILL
St Stanislaus
Chapel Hill
Pleasant Hill
PHILLIPSBURG
MUELLERSVILLE
C O U N T Y
T I N

Send original copy by certified mail to the Texas Department of Water Resources
P. O. Box 13087
Austin, Texas 78711

State of Texas
WATER WELL REPORT

ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 59-53-6PP
Located on map yes
Received: C.F.S

1) OWNER LOUIS RYCHLIK (Name) Address P.O. BOX 202 (Street or RFD) - BRENHAM (City), TEXAS (State) 77833 (Zip)

2) LOCATION OF WELL:
County WASHINGTON ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.
2

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☑ See attached map. map on 59-44-4B

3) TYPE OF WORK (Check):
☑ New Well ☐ Deepening
☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check):
☑ Domestic ☐ Industrial ☐ Public Supply
☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check):
☑ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored
☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:
Date drilled 10-23-81

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
6 1/4	Surface	256

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☑ Gravel Packed ☐ Other ______
If Gravel Packed give interval . . . from 214 ft. to 256 ft.

From (ft.)	To (ft.)	Description and color of formation material
0	10	SAND & CLAY
10	20	SOFT ROCK & SHALE
20	22	HARD ROCK
22	24	SAND
24	32	SHALE
32	38	SAND & SHALE
38	55	SHALE
55	60	SHALE & STRKS. ROCK
60	69	SAND & SHALE
69	97	SHALE & STRKS. ROCK
97	108	RED SHALE
108	114	WHITE SHALE
114	130	GREEN SHALE
130	175	SHALE
175	190	SHALE
190	199	ROCK
199	203	BLUE SANDY SHALE
203	230	ROCK & STRKS. SHALE
230	256	SAND & STRKS. ROCK

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	Setting (ft.) To	Gage Casing Screen
4	N	PVC CASING	0	230	
2	N	GALV. SCREEN	214	256	

CEMENTING DATA
Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or individual)

9) WATER LEVEL:
Static level ______ ft. below land surface Date ______
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

12) WELL TESTS:
☐ Type Test: ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ______ gpm with ______ ft. drawdown after ______ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☑ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☑ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME VERDE POMYKAL (Type or Print) Water Well Drillers Registration No. 191

ADDRESS P.O. BOX 672 (Street or RFD) BRENHAM (City), TEXAS (State) 77833 (Zip)

(Signed) Verde Pomykal (Water Well Driller) POMYKAL DRILLING CO. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

60 GW 7

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No.
Located on map
Received:
Form GW 8
Form GW 9

1) OWNER:
Person having well drilled Sirilo J. Vasquez (Name) Address Gay Hill (Street or RFD) (City) (State)
Landowner Sirilo J. Vasquez (Name) Address Gay Hill (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington Labor League Abstract No.
NW¼ NE¼ SW¼ SE¼ of Section Block No. Survey
(Circle as many as are known)
miles in (NE, SW, etc) direction from (Town)

NORTH

Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check): New Well ☒ Deepening ☐ Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check): Domestic ☒ Industrial ☐ Municipal ☐ Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check): Rotary ☒ Driven ☐ Dug ☐ Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 141 ft. Depth of completed well 141 ft. Date drilled 8-2-68
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	8	Clay	135	141	Shale Sandy
8	75	Rock & Clay			
75	109	Shale			
109	118	Rock			
118	122	Shale			
122	126	Rock			
126	129	Shale			
129	135	Sand			(Use reverse side if necessary)

7) COMPLETION (Check): Straight wall ☐ Gravel packed ☒ Other ☐ Under reamed ☐ Open hole ☐

8) WATER LEVEL: Static level 43 ft. below land surface Date 8-2-68
Artesian pressure ___ lbs. per square inch Date

9) CASING: Type: old ☐ New ☒ Steel ☒ Plastic ☐ Other ☐
Cemented from ___ ft. to ___ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4"	0	127	.237

10) SCREEN: Type
Perforated ☐ Slotted ☒

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
2"	120	.060	

11) WELL TESTS: Well blew 1500 G.P.H.
Was a pump test made? ☐ Yes ☐ No If yes by whom?
Yield: ___ gpm with ___ ft. drawdown after ___ hrs
Bailer test ___ gpm with ___ ft. drawdown after ___ hrs
Artesian flow ___ gpm Date
Temperature of water
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? ___ depth of strata

12) PUMP DATA:
Manufacturer's Name Sta-Rite
Type Jet pump H.P. 3-4
Designed pumping rate 300 gpm ☐ gph ☒
Type power unit Elec.
Depth to bowls, cylinder, jet, etc., ___ ft. below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Roger Pomykal (Type or Print) Water Well Drillers Registration No. 190

Address ~~Route 3, Box 424~~ 2 Brenham, Texas 77833 P.O. Box 672 (Street or RFD) (City) (State)

(Signed) Roger Pomykal (Water Well Driller) Pomykal Drilling Company (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).

RECEIVED FEB 26 1982 DEPT. OF WATER RESOURCES

5953 6R

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711	State of Texas WATER WELL REPORT	For TWDB use only Well No. Located on map Received: Form GW 8 Form GW 9

1) OWNER:
Person having well drilled Jethro Johnson (Name) Address Gay Hill, Texas (Street or RFD) (City) (State)

Landowner Jethro Johnson (Name) Address Gay Hill, Texas (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington Labor ______ League ______ Abstract No. ______

NW¼ NE¼ SW¼ SE¼ of Section ______ Block No. ______ Survey ______
(Circle as many as are known)

______ miles in ______ (NE, SW, etc.) direction from ______ (Town).

NORTH

Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well ☒ Deepening ☐
Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check):
Rotary ☒ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 6½ in. Depth drilled 159 ft. Depth of completed well 159 ft. Date drilled 8-28-68

All measurements made from ______ ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	10	clay			
10	140	Hard sandy shale			
140	159	sand			

(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall ☐ Gravel packed ☒ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level 63 ft. below land surface Date 8-28-68
Artesian pressure ______ lbs. per square inch Date ______

9) CASING:
Type: Old ☐ New ☒ Steel ☒ Plastic ☐ Other ☐
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4"	0	140	.237

10) SCREEN:
Type ______
Perforated ☐ Slotted ☒

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
2"	129	159	.060

11) WELL TESTS: Well blew 2000 gph
Was a pump test made? ☐ Yes ☐ No If yes by whom?
Pemykal Drilling Company
Yield: ______ gpm with ______ ft. drawdown after ______ hrs
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs
Artesian flow ______ gpm Date ______
Temperature of water ______
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? ______ depth of strata ______

12) PUMP DATA:
Manufacturer's Name Sta-Rite
Type Sub. H.P. ½
Designed pumping rate 600 gpm ☐ gph ☒
Type power unit Elec
Depth to bowls, cylinder, jet, etc., 105 ft. below land surface.

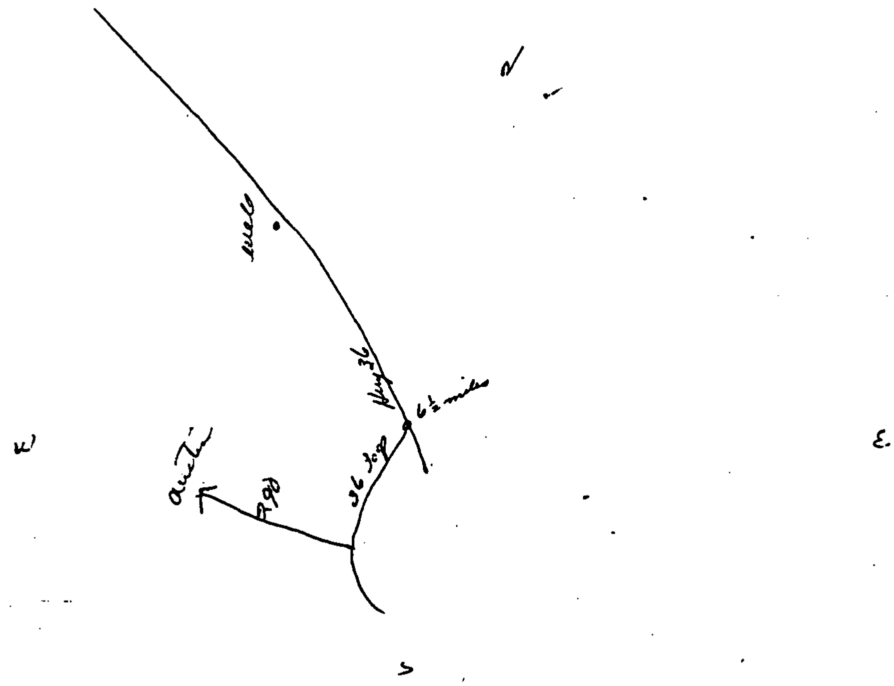
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Verde Pemykal (Type or Print) Water Well Drillers Registration No. 190

Address ~~Route 3, Box 424-A~~, Brenham, Texas P.O. Box 672 (Street or RFD) (City) (State)

(Signed) Verde Pemykal (Water Well Driller) Pemykal Drilling Company (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.



6½ miles from 36 Loop + business Hwy 36 NW.

6R

Send original copy by certified mail to the Texas Water Development Board P. O. Box 13087 Austin, Texas 78711

State of Texas

WATER WELL REPORT

For TWDB use only
Well No.
Located on map
Received:

1) OWNER:
Person having well drilled Marvin Wiedemann (Name) Address P.O. Box 802, Brenham, Texas (Street or RFD) (City) (State)

Landowner Same (Name) Address Same (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington, ______ miles in ______ (N.E., S.W., etc.) direction from ______ (Town)

Locate by sketch map showing landmarks, roads, creeks, hiway number, etc.* North (Use reverse side if necessary)

or Give legal location with distances and directions from adjacent sections or survey lines.
Labor ______ League ______
Block ______ Survey ______
Abstract No. ______
(NW¼ NE¼ SW¼ SE¼) of Section ______

3) TYPE OF WORK (Check): New Well x Deepening Reconditioning Plugging

4) PROPOSED USE (Check): Domestic x Industrial Municipal Irrigation Test Well Other

5) TYPE OF WELL (Check): Rotary x Driven Dug Cable Jetted Bored

6) WELL LOG:
Diameter of hole 6 ½ in. Depth drilled 304 ft. Depth of completed well 304 ft. Date drilled 2/27/73
All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material
0	2	top soil
2	10	shale
10	32	sand a nd rock
32	43	shale
43	50	sand
50	65	shale strks rock
65	72	sand
72	90	shale
90	120	shale, rock strks sand
120	210	shale
210	250	rock, hard
250	275	sandy shale
275	303	soft rock, coarse or hard sand
303	304	shale

(Use reverse side if necessary)

9) Casing:
Type: Old New x Steel x Plastic Other
Cemented from ______ ft. to ______ ft.

Diameter (inches)	Setting From (ft.)	To (ft.)	Gage
4	0	279	.237

10) SCREEN:
Type ______
Perforated Slotted x

Diameter (inches)	Setting From (ft.)	To (ft.)	Slot Size
2	262	304	.060

7) COMPLETION (Check):
Straight wall ___ Gravel packed x Other
Under reamed Open Hole

8) WATER LEVEL:
Static level 118 ft. below land surface Date 2/27/73
Artesian pressure ______ lbs. per square inch Date ______
Depth to pump bowls, cylinder, jet, etc., ______ ft. below land surface.

Well blew 60 g.p.m.

11) WELL TESTS:
Was a pump test made? Yes No If yes, by whom?
Yield: ______ gpm with ______ ft. drawdown after ______ hrs.
Bailer test ______ gpm with ______ ft. drawdown after ______ hrs.
Artesian flow ______ gpm
Temperature of water ______

12) WATER QUALITY:
Was a chemical analysis made? Yes No
Did any strata contain undesirable water? Yes No
Type of water? ______ depth of strata ______

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Verde Pomykal (Type or Print) Water Well Drillers Registration No. 101

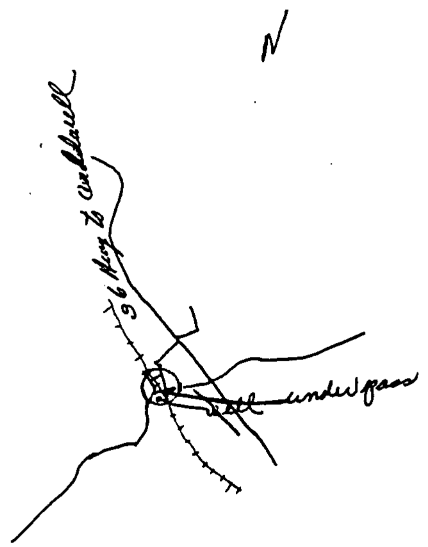
ADDRESS P.O. Box 672, Brenham, Texas (Street or RFD) (City) (State)

(Signed) Verde Pomykal (Water Well Driller) Pomykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

*Additional instructions on reverse side.

TWDB-WD-8



1/16 mile from underpass

64 GW 7

5-1

Send original copy by certified mail to the Texas Water Development Board P. O. Box 12386 Austin, Texas 78711	State of Texas WATER WELL REPORT	For TWDB use only Well No. ____ Located on map ____ Received: ____ Form GW 8 ____ Form GW 9 ____

1) OWNER:
Person having well drilled Willie Brinkmeyer (Name) Address Brenham, Texas (Street or RFD) (City) (State)

Landowner Same (Name) Address Same (Street or RFD) (City) (State)

2) LOCATION OF WELL:
County Washington Labor ____ League ____ Abstract No. ____

NW¼ NE¼ SW¼ SE¼ of Section ____ Block No. ____ Survey ____
(Circle as many as are known)

miles in ____ (NE, SW, etc.) direction from ____ (Town).

NORTH

Sketch map of well location with distances from adjacent section or survey lines, and to landmarks, roads, and creeks.

3) TYPE OF WORK (Check):
New Well ☒ Deepening ☐
Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF WELL (Check):
Rotary ☒ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored ☐

6) WELL LOG:
Diameter of hole 6 ½ in. Depth drilled 245 ft. Depth of completed well 245 ft. Date drilled 8/18/69

All measurements made from 0 ft. above ground level.

From (ft.)	To (ft.)	Description and color of formation material	From (ft.)	To (ft.)	Description and color of formation material
0	4	black land	214	245	rock w/soft streaks
4	16	sand and rock			
16	20	clay			
20	40	sand and rock			
40	101	clay and rock			
101	159	shale			
159	180	rock and shale			
180	214	rock			(Use reverse side if necessary)

7) COMPLETION (Check):
Straight wall ☐ Gravel packed ☒ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level 85 ft. below land surface Date 8/18/69
Artesian pressure ____ lbs. per square inch Date ____

9) CASING:
Type: Old ☐ New ☒ Steel ☒ Plastic ☐ Other ☐
Cemented from ____ ft. to ____ ft.

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Gage
4"	0	216	.237

10) SCREEN:
Type ____
Perforated ☐ Slotted ☒

Diameter (inches)	Setting From (ft.)	Setting To (ft.)	Slot size
2"	203	245	.060

11) WELL TESTS: Well blew 2400 gph
Was a pump test made? ☐ Yes ☐ No If yes by whom? ____
Yield: ____ gpm with ____ ft. drawdown after ____ hrs
Bailer test ____ gpm with ____ ft. drawdown after ____ hrs
Artesian flow ____ gpm Date ____
Temperature of water ____
Was a chemical analysis made? ☐ Yes ☐ No
Did any strata contain undesirable water? ☐ Yes ☐ No
Type of water? ____ depth of strata ____

12) PUMP DATA:
Manufacturer's Name Sta-rite
Type Sub H.P. 3/4
Designed pumping rate ____ gpm ☐ gph ☐
Type power unit Elec.
Depth to bowls, cylinder, jet, etc., 132 ft. below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME Roger Pomykal (Type or Print) Water Well Drillers Registration No. 190

Address P.O.Box 672, Brenham, Texas (Street or RFD) (City) (State)

(Signed) Roger Pomykal (Water Well Driller) Pomykal Drilling Co. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

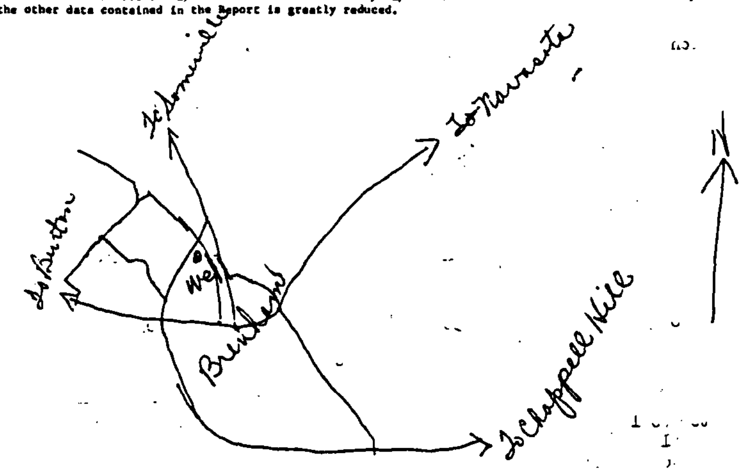
2) LOCATION OF WELL:

The sketch showing the well location must be as accurate as possible, showing landmarks, in sufficient detail so that the well may be plotted on a General Highway Map of the county in which the well is located.

Reference points from which distances are measured and directions given should be of a permanent nature (e.g. highway intersections, center of towns, river and creek bridges, railroad crossings). The distance and direction from the nearest town should always be indicated.

When giving a legal description include a sketch showing location of the well within the described area. e.g. survey abstract.

Information furnished in Section 2) of the TWDBE-GW-53 is very important. Unless the well can be accurately located on a map the value of the other data contained in the Report is greatly reduced.



Well is located west of Brenham City Limits Washington Co.

RECEIVED
APR 24 1973
Central Records
Texas Water Development Board

RECEIVED
MAR 12 1973
TEXAS WATER DEVELOPMENT BOARD

196 DUP

Send original copy by certified mail to the Texas Department of Water Resources P. O. Box 13087 Austin, Texas 78711

State of Texas
WATER WELL REPORT
ATTENTION OWNER: *Confidentiality Privilege Notice on Reverse Side*

For TDWR use only
Well No. 59-53-6U
Located on map YES
Received: [illegible]

1) OWNER MR. HERMANN AHRENS (Name) Address RT I (Street or RFD) Brenham (City) (State) (Zip)

2) LOCATION OF WELL:
County WASHINGTON miles in ½ M N (N.E., S.W., etc.) direction from BRENHAM (Town)

Driller must complete the legal description to the right with distance and direction from two intersecting section or survey lines, or he must locate and identify the well on an official Quarter- or Half-Scale Texas County General Highway Map and attach the map to this form.

☐ Legal description:
Section No. ______ Block No. ______ Township ______
Abstract No. ______ Survey Name ______
Distance and direction from two intersecting section or survey lines ______

☒ See attached map. ON 59-52-7T

3) TYPE OF WORK (Check): ☒ New Well ☐ Deepening ☐ Reconditioning ☐ Plugging

4) PROPOSED USE (Check): ☒ Domestic ☐ Industrial ☐ Public Supply ☐ Irrigation ☐ Test Well ☐ Other ______

5) DRILLING METHOD (Check): ☒ Mud Rotary ☐ Air Hammer ☐ Driven ☐ Bored ☐ Air Rotary ☐ Cable Tool ☐ Jetted ☐ Other ______

6) WELL LOG:

Date drilled Sep 14-81

DIAMETER OF HOLE

Dia. (in.)	From (ft.)	To (ft.)
7	Surface	128

7) BOREHOLE COMPLETION:
☐ Open Hole ☐ Straight Wall ☐ Underreamed
☐ Gravel Packed ☒ Other SCREENS
If Gravel Packed give interval . . . from ______ ft. to ______ ft.

From (ft.)	To (ft.)	Description and color of formation material
0	15	SAND
15	45	SAND INT. W/ SAND STONE AND WHITE SHALE
45	90	SAND STONE INT. W/ SAND
90	107	WATER SAND
107	128	SAND STONE

(Use reverse side if necessary)

8) CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mgf., if commercial	Setting (ft.) From	To	Gage Casing Screen
4"		P.V.C. S/40	0	89	
		SCREENS P.V.C	89	109	

CEMENTING DATA
Cemented from ______ ft. to ______ ft.
Method used ______
Cemented by ______ (Company or Individual)

9) WATER LEVEL:
Static level 60 ft. below land surface Date ______
Artesian flow ______ gpm. Date ______

10) PACKERS: Type Depth

11) TYPE PUMP:
☐ Turbine ☐ Jet ☒ Submersible ☐ Cylinder
☐ Other ______
Depth to pump bowls, cylinder, jet, etc., ______ ft.

12) WELL TESTS:
☐ Type Test: ☒ Pump ☐ Bailer ☒ Jetted ☐ Estimated
Yield: 20 gpm with ______ ft. drawdown after ______ hrs.

13) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable water? ☐ Yes ☒ No
If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? ______ Depth of strata ______
Was a chemical analysis made? ☐ Yes ☐ No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

NAME JOHN EBERT (Type or Print) Water Well Drillers Registration No. 2093

ADDRESS Box 532 (Street or RFD) BRENHAM (City) TX (State) 77833 (Zip)

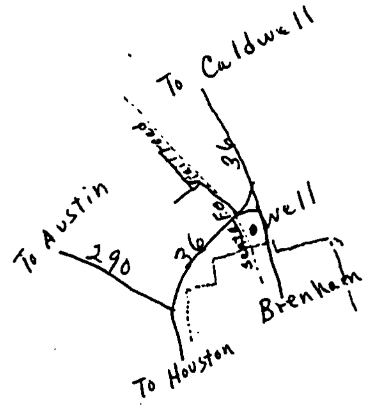
(Signed) John Ebert (Water Well Driller) HARVEY'S DRILLING CO. (Company Name)

Please attach electric log, chemical analysis, and other pertinent information, if available.

TDWR-0392 (Rev. 1-12-79) DEPARTMENT OF WATER RESOURCES COPY

Well is ap. rox. ½ M. N.E. o State Hiway

Washington Co.



John Moyer
6020

P.S. wells w/in 4 mi of Petete site

6239 0049 A Country Place NW
- appears to be 59-59-53-5cc - no log found
Hal Marmon
409-836-5664 Population 45

6 2390001 B City of Brenham, well #12?
Serves 13,000 people, emergency back up
59-53-915 use 11,952 Tx Manual
Howard Hagood P.O. Box 1059 77834

6239 0001 A City of Brenham

6 2390042 A Brenham Bowling 53-503 ?
Redmon
Paul Sims 409-836-7640 pop 25 two
2905 290 W

6 2390042 B Brenham Bowling 53-503 ?

6239 0005 A Vegas Development Corp 53-201?
Cole - Kill FWSD No 1
P.O. Box 157 77833 pop 291
Felton Wilhelm 409 836-0651

IMPORTANT NOTICE FOR PERSONS HAVING WELLS DRILLED CONCERNING PRIVILEGE OF CONFIDENTIALITY

The Water Well Drillers Board and the Department of Water Resources are concerned that some persons having water wells drilled may not be aware of the confidentiality privilege provision of Section 5 of the Water Well Drillers Act. Section 5, the Reporting of Well Logs, reads as follows:

> "Every registered water well driller drilling, deepening, or otherwise altering a water well within this State shall make and keep, or cause to be made and kept, a legible and accurate well log, and within sixty (60) days from the completion or cessation of drilling, deepening or otherwise altering such a water well, shall deliver or transmit by certified mail a copy of such well log to the Commission, and the owner thereof or the person having had such well drilled. The well log required herein shall at the request in writing to the Commission, by certified mail, by the owner or the person having such well drilled be held as confidential matter and not made of public record."

18-

The last sentence specifies the means whereby you can, if you wish, assure that logs of your wells will be kept confidential. Please note that the term "Commission" in the above-quoted section and elsewhere in the Water Well Drillers Act now properly means the Texas Department of Water Resources (P. O. Box 13087; Austin, Texas 78711).

G2390057A Green Meadow Ln Water System
Ron Gerzer Lot 1, Green Meadow Ln.
3-4 409-836-7105 pop 51

G2390057B

G2390056A Lucky Lane Subdivision 53-204?
~~3-204~~ S Kimberly Ln 77833
3-4 Dave Holloway 409 880-1332 pop 40

G2390051A 53-402?
Cajun Trail Mob Home Park
3-4 Alfred Becker (409) 836 6555 pop 54
Rt 6 Box 2031 77833

G2390055A 53-802?
Camp Washington Co. USA
2-3 John Murphy 409-836-8251 pop 654
P.O. Box 280

TELEPHONE MEMO TO THE FILE

(Please complete with typewriter or black pen)

Call To: Larry Firestone
Date of Call: 3-8-96 3:30
Phone No.: (409) 277-1266

Call From: Ray Newby
File No.: OBF
Subject: City of Brenham Wells

Information for File: City Well # 12 - near railroad spur - only well operational serves population of ~ 13,000 on emergency basis.
Need to call to line up sampling time.
- water supplied by Lake Somerville

Water supply for residents on Burleson Street provided by well @ Country Place west subdivision

Jim Brown - City of Brenham Water Dept
day supervisor maintains Country Place Well as a 2nd job.

Signed: [signature]

TWC-0225B (Rev. 09-01-85)

6239000 1 A

WRD Exp. (C1)
April 1966

Well No. YY 59-53-915

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

H. JERRY ROUSH, 1969, WATER SUP.

MASTER CARD

C. J. BLUM — 1: 24,000

Record by W. SANDEE — Source of data HERBERT RUST — Date 7-24-68 — Map CHAPPELL HILL, 1963

State TEXAS [48] — County (or town) WASHINGTON [YY]

Latitude: [300955N] — Longitude: [0962305] — Sequential number: [1]

Lat-long accuracy: [2] — S, R, Sec

Local well number: [YY-59-53-915] — Other number: 12

Local use:

Owner or name: CITY OF BRENHAM, P.O. BOX 361

Owner or name: [CTY BRENHAM] — Address: BRENHAM, TEXAS 778.

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — [M]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) PS, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — [W]

DATA AVAILABLE: Well data [ ] — Freq. W/L meas.: 12-30-63 [D] — Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data: type: [C]

Freq. sampling: 7-24-68 (R) [D] — Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [D]

WELL-DESCRIPTION CARD — TEST HOLE 1002

SAME AS ON MASTER CARD — Depth well: 820 ft [820] — Meas. Rept. DRL [R]

Depth cased (first perf.) 73 ft [73] — Casing type: 12 3/4 : 415, 10 3/4 : 820 — Diam. 10 3/4 CO in [10]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — [S]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — [H]

Date Drilled: NOV. 1963 [963] — Pump intake setting: 400 ft [400]

Driller: TEXAS WATER WELLS — name — HOUSTON — address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — [T] — Deep / Shallow [D]

Power (type): diesel, (elec), nat gas, gasoline, hand, LP gas, wind; H.P. 75 [V] — Trans. or meter no.

Descrip. MP — ft above/below LSD. Alt. MP

Alt. LSD: 267± [267] — Accuracy (source) [4]

Water Level: R 42 ft above/below MP; Ft above/below LSD [42] — Accuracy: [D]

Date meas.: 12-30-63 [063] — Yield: gpm — Method determined

Drawdown: ft — Accuracy — Pumping period hrs

QUALITY OF WATER DATA: Iron ppm — Sulfate ppm — Chloride ppm — Hard. ppm

Sp. Conduct K x 10⁶ — Temp. — Date sampled

Taste, color, etc.

Well No. YY-59-53-915

Latitude-Longitude 30 07 55 96 23 08

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage Basin: 528 Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (0) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat S

MAJOR AQUIFER: system, series TM Catahoula C aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 203 ft 203 Depth to top of: 75 ft 75

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: (133) ft (64) Depth to top of: (50) (60)

Intervals Screened: 75-86; 120-143, 350-414; 468-518; 750-810

11
23
64
50
60
208

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

LOCATED AT NORTH END OF OLD AIRPORT ON S SIDE OF DRAW AND SOUTH OF SOUTHERN PACIFIC RR TRACKS.

UTM WATER LEVEL IN 1968 DUE TO "WET HOLE".

Well No.

GPO 857-700

WATER SUPPLY, DEEP WELLS AND PUMPS

A. E. FAWCETT, JR., PRESIDENT

TEXAS WATER WELLS
INC.

TRU-GRAVEL-WALL WELLS

951 MCCARTY DRIVE, HOUSTON 29, TEXAS, PHONE OR-2-7581

November 1963

CITY OF BRENHAM, TEXAS

WATER WELL 12

SETTING DATA

SURFACE CASING

SET AND CEMENTED IN PLACE 70' of 20" O.D., .375" W.T.

P. E. Pipe

SCREEN AND BLANK LINER:

FROM	TO	DESCRIPTION
0'	75'	12 3/4" Blank Liner
75'	96'	12 3/4" S. S. Screen .050 Ga.
96'	129'	12 3/4" Blank Liner
129'	143'	12 3/4" S. S. Screen .050 Ga.
143'	350'	12 3/4" Blank Liner
350'	414'	12 3/4" S. S. Screen .030 Ga.
414'	415'	12 3/4" to 10 3/4" Swage
415'	468'	10 3/4" Blank Liner
468'	516'	10 3/4" S. S. Screen .040 Ga.
516'	750'	10 3/4" Blank Liner
750'	810'	10 3/4" S. S. Screen .035 Ga.
810'	820'	10 3/4" Blank with B.P.V. and W. W. P.

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TDWR ONLY

Organization No. ______ Lab No. 02

Work No. ______

CHEMICAL WATER ANALYSIS REPORT

County 239 WASHINGTON

State Well No. 59-53-915

Well No. ______

Date Collected 07-24-68

Send report to:

Data Collection and Evaluation Section
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711

Location CITY BRENHAM #12 Sample No. ___ By W. SANDEEN - USGS

Source (type of well) ______ Owner CITY OF BRENHAM

Date Drilled 1963 Depth 820 ft. WBF —

Producing intervals 75-810 Water level ______ ft. Sample depth ______ ft.

Sampled after pumping 2 HRS hrs. Yield 450 GPM meas./est. Temperature ___ °F 25 °C

Point of collection 2" VALVE AT WELL Appearance ☒ clear ☐ turbid ☐ colored ☐ other

Use P.S Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

Constituent	Code	MG/L	ME/L
Silica	00955	45	
Calcium	00915	80	3.99
Magnesium	00925	3	.21
Sodium	00929	25	1.09
Total			.
☐ Potassium	00937	3.7	
[3]☐ Manganese	01055	.	
☐ Boron	01022	.	
[3]☐ Total Iron	01045	.0	
☐ (other) ______ MG/L			

%Na ______

SAR ______

RSC ______

Specific Conductance (micromhos/cm³) · 00095 500

Diluted Conductance (micromhos/cm³) X

"☐" items will be analyzed if checked.

Constituent	Code	MG/L	ME/L
Carbonate	00445	0	.00
Bicarbonate	00440	268	4.39
Sulfate	00945	10	.21
Chloride	00940	25	.71
Fluoride	00951	.3	.02
Nitrate	71850	1.3	.02
pH	00403	7.4	
Total			5.35
[1]Dissolved Solids (residue at 180°C)	70300		325
Phenolphthalein Alkalinity as $CaCO_3$	00415		
Total Alkalinity as $CaCO_3$	00410		
Total Hardness as $CaCO_3$	00900		210
[2]Nitrogen Cycle			
Ammonia - N	00610		.
Nitrite - N	00615		.
Nitrate - N	00620		.
Organic Nitrogen	00605		.

[1]The bicarbonate reported in this analysis can be converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure used in the computation of dissolved solids.
[2]Nitrogen cycle requires separate sample.
[3]Total Iron and Manganese require separate sample.

Analyst ______ Checked By ______

TDWR 0142 (R-1-8-80)

Geological Survey — UNITED STATES DEPARTMENT OF THE INTERIOR — Ground Water Analysis — Water Resources Divis. Austin, Texas

City of Brenham
P.O. Box 361
Brenham, Tex. 77833

16240

State: Texas 4 9 County: Washington Y/Y Well No. Latitude 3 0 0 9 5 5 N Longitude 0 9 6 2 3 0 8 Seq. No. 1 Date M D Y 0 7 2 4 6 8 Sampling Depth Type B

KEY PUNCHED

Local Well No. YY 59-53-915 Location City Brenham #12 Date drilled: 1963 Depth 820' WBF Prod. intervals 75-810 Water level UTM
Owner. City of Brenham Yield 450 GPM Pt. of coll. 2" valve at well Appearance clear Use Public Supply Collector W. Sandeen
Sampled after pumping 2 hrs.

Constituent	Data	mg/l	me/l
K x 10⁶	R KCl 336 R sample 672	500	
pH	7.4		
Temperature °C	25	25	
Density at 20°C			
SiO₂	5 ml; sample 45.0	45	
Al	A 0.00250 mg; .00625 mg; .0125 mg; .025 mg; Sample		
Fe	A 0.025 mg; 25 ml .000 Sample Total / mg/l; Sample Diss. .00 mg/l		
Na	Na & Estate; Total; Dissolved		
Ca	25 ml; 4.00	80	3.99
Mg	2.5	25	.21
Na (K)	24.8	25	1.09
Na + K Calc.			
K	2.0 ml nyal added; 3.06 X 1.200	3.7	.09
Percent error	+0.3	Total cations	[illegible]

Constituent	Data	mg/l	me/l
HCO₃	6.70; 25 ml; Total Alk as CO₃ 132	268	4.39
CO₃	25 ml	0	.00
SO₄	10 ml; Blk; Std; Sample .50	10	.21
Cl	2.50; 50 ml	25	.71
Source 79	Card No. 80 0		
F	10 ml; A 1.00 mg/l; 2.00 mg/l; A sample .285	.3	.02
NO₃	ml std. 10 ml; A sample 1.32; A ml std; A ml std Factor	1.3	.02
NO₂	ml; A 0.01 mg; .02 mg; .05 mg; Sample	mg/l	
PO₄	50 ml Ortho .02 Total; A 0.0050 mg; .0100 mg; .0250 mg; .0500 mg; Sample .020	.02	.00
Total anions			5.35

Milliequivalents per liter: Na+K — Cl; Ca — HCO₃+CO₃; Mg — SO₄

Constituent	Data
B	A .056 mg; .5 ml; .00024 X200
Al	
Fe	
Mn	
Cu	
Pb	
Zn	
Dissolved solids: Determined	
Calculated	32[illegible]
Hardness	me/l Ca + Mg 4.20; me/l Alk 4.39; me/l NCH
Ca+Mg	21[illegible]
NCH	
Color	0
Card No.	
Br	
Alk. as CaCO₃	
Free CO₂	
Percent Na	20
SAR	.8
RSC	
MBAS	
NO₂	
Card No.	

Analyst L. WASHINGTON Checked by WILLARD J.
Date begun Completed SEP 1 6 1968

Transmittals	Date
Records processing	OCT 2 1 1968
Collector	X
Owner	

Recorded by: Punched by: Date:

G739000 A

1-2 mi SW
Pub. Supply
420 NA

WRD Exp. (C4)
April 1966

Well No. YY 59-53-503

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD — 1:24,000

Record by W. Sandeen Source of data D.W. Fischer Date 10-18-68 Map Brenham: 1963

State TEXAS [48] County (or town) WASHINGTON [YY]

Latitude: 3 0 1 0 0 3 N Longitude: 0 9 6 2 6 2 Sequential number: 1

Lat-long accuracy: 1 T ___ S, R ___ W, Sec ___

Local well number: YY-59-53-503 Other number: (W. P. C. Barnes)

Local use: Owner or name: Brenham Bowling Cor

Owner or name: BRENHAM BOWLING Address: Box 592 Brenham, Texas

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co., (P) Private, (S) State Agency, (W) Water Dist — N

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — Supplies Bowl-Brenham & Motel — C

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — W

DATA AVAILABLE: Well data ___ Freq. W/L meas.: ___ N Field aquifer char. ___

Hyd. lab. data:

Qual. water data: type:

Freq. sampling: NA N Pumpage inventory: yes no, period:

Aperture cards: yes

Log data:

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 420 ft 420 Meas. Rep. accuracy 6

Depth cased: (first perf.) ___ ft Casing type: S Diam. 4 in 4

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: 1959 959 Pump intake setting: ___ ft

Driller: Pomykal Drlg Co. name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — S Deep Shallow

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; H.P. NA Trans. or meter no.

Descrip. MP ___ ft above below LSD, Alt. MP

UTM Alt. LSD: 405± 405 Accuracy: (source) 4

Water Level ___ ft above below MP; ft above below LSD Accuracy:

Date meas: Yield: ___ gpm Method determined

Drawdown: ___ ft Accuracy: Pumping period ___ hrs

QUALITY OF WATER DATA: Iron ___ ppm Sulfate ___ ppm Chloride ___ ppm Hard. ___ ppm

Sp. Cond ___ K x 10^6 Temp. ___ °F Date sampled

Taste, color, etc.

Well No.

Well No. YY 9-53-503

Latitude-longitude 30 10 03 s 96 26 21
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 0 3 Section:

E Drainage Basin: 5 2 B Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat

MAJOR AQUIFER: system, series T M aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

WELL LOCATED IN SMALL WOODEN BUILDING BEHIND BOLERAMA.

Well No.

GPO 857-700

59-53-504

File original copy with Texas Water Commission P. O. Box 2311, Capitol Station Austin 11, Texas

State of Texas

DRILLERS LOG AND WELL DATA REPORT

For use by TWC only
Well No.
Located on map
By
Date
Map no.

Pub. Supply
480'
447-480'
141'
6-64

1) Well Owner: R. C. Barnes ~~[illegible]~~ Bowlerama, Brenham, Texas
2) Land Owner:
3) Intended use: Industrial ☐ Municipal ☐ Irrigation ☐ Other Bowlerama and motel
4) Location of well: County Washington Labor League Abstract No.
NE SE SW SE of Section Block No. Survey

miles in direction
from Hwy 290 West

2 miles West of Courthouse
Brenham

Sketch map of well location with distances from two section or survey lines, and to landmarks, roads, and creeks.

DRILLERS LOG OF WELL

Method of drilling: rotary Diameter of hole 6¾" in. Date drilled June 18, 1964

All measurements made from 0 ft. above ground level.

From (ft)	To (ft)	Description and color of formation material	From (ft)	To (ft)	Description and color of formation material
0	10	clay	445	465	sand
10	18	sand	465	480	"
18	80	shale			
80	125	sandy shale and rock			
125	160	sand			
160	185	shale			
185	200	sand			
200	280	shale			
280	340	rock			
340	445	shale and rock			

(Use continuation sheets if necessary)

COMPLETION DATA

COMPLETION

Straight wall ☐
Under reamed ☐
Gravel packed ☒
Open hole ☐
Other

CASING

Type: Old ☐ New ☒
Cemented from ft. to ft.

Diameter (inches)	Setting from (ft)	Setting to (ft)
4"	0	447

SCREEN

Type
Perforated ☐ Slotted ☒

Diameter (inches)	Setting from (ft)	Setting to (ft)
2"	447	480

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

Vernie Pomykal (Signature) Pomykal Drilling Company (Company Name) Reg. No. 387

Please attach electric log, chemical analysis, and other pertinent information if available.

If well was tested by your company or if you installed the permanent pump please complete the following:

WATER LEVEL AND PUMP DATA

Static water level 141 ft. below ground level

Pumping level

feet	hours	gpm

Flow 3600 gph.

Pump type Submergible
Designed pumping rate 1200 gph gpm ☐ gph ☐
Type power unit Elec.
Horsepower 1½ HP.
Depth to bowls, cylinder, jet, etc., ft. below pump base.

Name of contractor testing well or installing permanent pump if other than your company:

C-34 (62-4)

YY 59-53-504

WRD Exp. (CW)
April 1966

Well no. YY-59-53-504

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD — D.W. FISCHER — 1:24,000

Record by W. SANDEEN Source of data DRLS LOG Date 10-18-68 Map BRENHAM; 1963

State TEXAS [4 8] County (or town) WASHINGTON [Y Y]

Latitude: [3 0 1 0 0 3 N] Longitude: [0 9 6 2 6 2 1] Sequential number: [2]

Lat-long accuracy: [1] T. ___ S. R. ___ W. Sec. ___

Local well number: [Y Y - 5 9 - 5 3 - 5 0 4] Other number: ___ B & M

Local use: ___ Owner or name: ORIG R. C. BARNES BRENHAM BOWLING CORP

Owner or name: BRENHAM BOWLING Address: Box 592 BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [P]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — SUPPLIES BOWLERAMA & MOTEL [C]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: R 6-18-64 [D] Field aquifer char. [ ]

Hyd. lab. data: ___ [ ]

Qual. water data: type: + Fe & Mn [A]

Freq. sampling: 10-18-68 [D] Pumpage inventory: yes no, period: ___ [ ]

Aperture cards: ___ yes [ ]

Log data: DRLS LOG [D]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 480 ft [4 8 0] Meas. Rept. 0 accuracy [3]

Depth cased (first perf.) 447 ft [4 4 7] Casing type: STEEL Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [P]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) h.d., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled 6-18-64 [9 6 4] Pump intake setting: ___ ft [ ]

Driller: POMYKAL DRLG CO. name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 1½ [T] Trans. or meter no. ___

Descrip. MP ___ ft above below LSD, Alt. MP ___

Alt. LSD: 400 [4 0 0] Accuracy (source) [4]

Water Level R 141 ft above below MP; Ft above below LSD [1 4 1] Accuracy ___ [D]

Date meas. 6-18-64 [6 6 4] Yield: ___ gpm [ ] Method determined [ ]

Drawdown: ___ ft [ ] Accuracy: [ ] Pumping period ___ hrs [ ]

QUALITY OF WATER DATA: Iron ___ ppm [ ] Sulfate ___ ppm [ ] Chloride ___ ppm [ ] Hard. ___ ppm [ ]

Sp. Conduct ___ K x 10^n [ ] Temp. ___ °F [ ] Date sampled [ ]

Taste, color, etc. ___

Well No.

Well No. YY 59-53-504

Latitude-longitude 30 10 03 96 26 21

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage Basin: 523 Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat S

MAJOR AQUIFER: system, series TM aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 33 ft 33 Depth to top of: 447 ft 447

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened: 447-480

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

59-53-9A

WELL LOCATED 200' BEHIND FIRST WELL IN OPEN SPOT ALONG GENTLE SLOPE.

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TDWR ONLY
Organization No. ______ Lab No. 02
Work No. ______

CHEMICAL WATER ANALYSIS REPORT

County 239 WASHINGTON
State Well No. 59-53-504
Well No. ______
Date Collected 10-18-68

Send report to:
Data Collection and Evaluation Section
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711

Location 1 MI. W OF BRENHAM, TEXAS Sample No. ___ By W. SANDEEN - USGS
Source (type of well) ______ Owner D. W. FISCHER
Date Drilled 1964 Depth 480 ft. WBF —
Producing intervals 447-480 Water level — ft. Sample depth ___ ft.
Sampled after pumping — hrs. Yield 60 GPM meas./est. Temperature ___°F ___°C
Point of collection HYDRANT IN WELL HOUSE Appearance ☒ clear ☐ turbid ☐ colored ☐ other
Use COMMERCIAL Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

Constituent	Code	MG/L	ME/L
Silica	00955		
Calcium	00915		
Magnesium	00925		
Sodium	00929		
Total			
☐ Potassium	00937		
[3] ☐ Manganese	01055	.0	
☐ Boron	01022		
[3] ☐ Total Iron	01045	.4	
☐ (other) ______ MG/L			

%Na ______
SAR ______
RSC .66

Constituent	Code	MG/L	ME/L
Carbonate	00445		
Bicarbonate	00440	340	
Sulfate	00945	16	.22
Chloride	00940	21	
Fluoride	00951	.8	.02
Nitrate	71850	.0	.00
pH	00403	7.0	
Total			
[1] Dissolved Solids (residue at 180°C)	70300		
Phenolphthalein Alkalinity as $CaCO_3$	00415		
Total Alkalinity as $CaCO_3$	00410		
Total Hardness as $CaCO_3$	00900	272	
[2] Nitrogen Cycle			
Ammonia - N	00610		
Nitrite - N	00615		
Nitrate - N	00620		
Organic Nitrogen	00605		

Specific Conductance (micromhos/cm3) 00095 598
Diluted Conductance (micromhos/cm3) x

"☐" items will be analyzed if checked.

[1] The bicarbonate reported in this analysis can be converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure used in the computation of dissolved solids.
[2] Nitrogen cycle requires separate sample.
[3] Total Iron and Manganese require separate sample.

Analyst ______ Checked By ______

TDWR 0148 (Rev. 1-8-80)

Geological Survey — Box 592, Brenham, Texas

00057

United States Department of the Interior
Ground Water Analysis

Water Resources Div.
Austin, Texas

State: Texas 4 8 — County: Washington — Y Y — Well No. Latitude 3 0 1 0 0 3 N — Longitude 0 9 6 2 6 2 1 — Seq. No. — Date M D Y 1 0 1 8 6 8 — Sampling Depth — Type H

Local Well No. YY-59-53-504 Location 1 mi. West of Brenham, Texas

KEY PUNCHED

(6-18-64)
R 141 Blw.

Owner: D. W. Fischer — Date drilled: 1964 — Depth: 480' WBF — Prod. intervals 447 to 480 — Water level LSD 4

Sample after pumping — Yield 60 GPM — Pt. of coll. Hydrant in well house — Appearance Clear — Use Commercial — Collector W. Sandeen

K x 10⁶ R KCl 204 R sample 341 — 598	HCO_3 25 ml — 9.30 / 8.50 Total Alk as CO_3 — mg/l 341	B A ___ mg
pH 7.0 — Temperature °C	CO_3 25 ml — 0 — .00	Al — Fe 37 .01 — Mn .01
Density at 20 C — mg/l — me/l	SO_4 10 ml; Blk .06; Std 5.08; Sample .82 — 16	Cu — Pb — Zn
SiO_2 ___ ml; A sample ___		Dissolved solids: Determined ___ Calculated ___
As ___ ml; A 0.0025 mg; .00625 mg; .0125 mg; .025 mg; Sample ___ mg/l	Cl 50 mm ml — 2.11 — 21	Hardness 25 ml — 680 me/l Ca + Mg — me/l Alk — me/l NCH — Ca+Mg 27 — NCh
	Source 79 — Card No. 80 0	
Fe A 0.025 mg — 325 — 25 ml — Sample Total 37 mg/l — Sample Diss. ___ mg/l	F .300 10 ml — A 1.00 mg/l — 2.00 mg/l — A sample ___ — 0	Color — Card No.
Mn Total .01 mg/l	NO_3 .006 ___ ml std. 10 ml — A sample — A ___ ml std — A ___ ml std — Factor — 0 — .00	Br — I
Dissolved ___ mg/l		Alk. as $CaCO_3$ — Free CO_2
Ca ___ ml	NO_2 ___ ml ___ mg/l — A 0.01 mg; .02 mg; .05 mg; Sample	Percent Na — SAR — RSC 6
Mg	PO_4 ___ ml Ortho ___ Total — A 0.0050 mg; .0100 mg; .0250 mg; .0500 mg; Sample	MBAS — NO_2 — Card No.
Na; Na + K Calc.	Total anions	Analyst HARY L. HODGS LUPE RAMOS — Checked by — Date begun OCT 3 1 1968 — Completed NOV 6 1968
K	Milliequivalents per liter: Na+K — Cl; Ca — HCO_3+CO_3; Mg — SO_4	Transmittals — Date; Records processing; Collector X; Owner
Percent error — Total cations		Recorded by ___ Punched by ___ Date ___

G239C0S'A

3-4 mi W
Comm → Publ Supp

WRD Exp. (GW)
April 1966

Well No. Y7-59-53-402

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD — 1:24,000

Record by W. SANDEEN Source of data Date 10-17-68 Map BRENHAM, 1963

State TEXAS [48] County (or town) WASHINGTON [Y Y]

Latitude: [3 0 1 0 3 5 N] Longitude: [0 9 6 2 7 5 6] Sequential number: [2]

Lat-long accuracy: [1] T. S, R. , Sec

Local well number: [Y Y - 5 9 - 5 3 - 4 0 2] Other number: "NEW WELL"

Local use: [ ] Owner or name: ROBERT LANGE

Owner or name: [ROBERT LANGE] Address: BOX 506 BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Privat, (S) State Agency, (W) Water Dist [P]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) PS, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — SUPPLIES 20 HOUSES OFFICE 60+ PEOPLE [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 10-17-68 [Φ] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: 10-17-68 [Φ] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD — Depth well: 436 ft [436] Meas. Rept. accuracy [6]

Depth cased (first perf.) ft [ ] Casing type: S ; Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: 1961± [961] Pump intake setting: ft [ ]

Driller: POMYKAL DRLG. CO.

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, gas, wind; H.P. 2 [T] Trans. or meter no.

Descrip. MP THRU ½ PLUG, TOP CASING 0.4 ft above below LSD, Alt. MP

Alt. LSD: 422 [422] Accuracy (source) [4]

Water Level 124 ASL ft above below MP, ft above below LSD [124] Accuracy: TAPE WMS [E]

Date meas. 10-17-68 [268] Yield: gpm [ ] Method determined [ ]

Drawdown: ft [ ] Accuracy: [ ] Pumping period: hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10⁶ [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

ASL
124.31±
USE 124
ASL
124.31
124.31
123.97

Well No.

Well No. YY-59-53-402

Latitude-longitude 30 10 35 96 27 56

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 0 3 Section:

F Drainage Basin: 5 2 9 Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (G) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat 4

MAJOR AQUIFER: system, series, aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series, aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas State Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE-GW ONLY

Program No. ______

Proj. No. ______

CHEMICAL WATER ANALYSIS REPORT

County YY WASHINGTON

State Well No. 59-53-402

Well No. ______

Date Collected 10-17-68

By ______

Send report to:

Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

Location 3 mi. W of Brenham

Source (type of well) ______ Owner Robert Lange

Date Drilled 1961 Depth 422 ft. WBF ______

Producing intervals ______ Water level ______ ft.

Sampled after pumping ______ hrs. Yield 15 GPM meas./est. Temperature ______ °F ______ °C

Point of collection ______ Appearance ☐ clear ☐ turbid ☐ colored ☐ other

Use PS Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

	MG/L	ME/L		MG/L	ME/L
Silica	44		Carbonate		
Calcium	101		Bicarbonate	350	
Magnesium	4		Sulfate	11	
Sodium	27		Chloride	21	
Total			Fluoride	0.3	
☐ Potassium			Nitrate	0.3	
☐ Manganese		%Na 18	pH	7.0	Total
☐ Boron		SAR 0.7	1/ Dissolved Solids (sum in MG/L)	381	
3/☐ Total Iron		RSC 0.34	Phenolphthalein Alkalinity as CaCO3		
☐ (other) ______ MG/L			Total Alkalinity as CaCO3		
Specific Conductance (micromhos/cm3)	613		Total Hardness as CaCO3	270	
Diluted Conductance (micromhos/cm3)	X		2/ Nitrogen Cycle: Ammonia - N		
			Nitrite - N		
			Nitrate - N		
			Organic Nitrogen		

"☐" items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.

2/ Nitrogen cycle requires separate sample.

3/ Total Iron requires separate sample.

TWDBE-GW-50 (Rev. 7-1-71)

Analyst ______ Checked By ______

Geological Survey

Robert Lange
Box 506
Brenham, Texas

00050

UNITED STATES DEPARTMENT OF THE INTERIOR
Ground-Water Analysis

Water Resources Division
Austin, Texas

State: Texas 4 9 County: Washington Y Y Well No. Latitude 3 0 1 0 3 5 N Longitude 0 9 6 2 7 5 6 Seq. No. 2 Date M D Y 1 0 1 7 6 8 Sampling Depth Type F

Local Well No. YY-59-53-402 Location 3 mi. W. of Brenham, Texas KEY PUNCHED Static blw. M.P. Water Level 150.4

Owner: Robert Lange Date drilled: 1961 Depth: 422' USF Prod. intervals LSD

Sampled after pumping one hr. Yield 15 GPM Pt. of coll. Spigot in yard Appearance Clear Use Public Supply Collector B. Sandeen

K x 10⁶ 204 K KCl # sample 333	613	HCO_3 50 ml 4.00 / 17.50 Total Alk as CO_3	350 mg/l
pH 7.0	Temperature °C	CO_3 50 ml	0 mg/l, .00 me/l
Density at 20 C	mg/l, me/l	SO_4 10 ml, Blk, Std, Sample .54	11
Si 25→100, 5 ml, A sample	44		.23
Al, ml, A 0.00250 mg, .00625 mg, .0125 mg, .025 mg, Sample	mg/l	Cl 50 MM ml 2.12	21
		Source 79, Card No. 80 0	
Fe A 0.025 mg .035 25 ml, Sample Total .04 mg/l, ml Sample Diss. mg/l		F .320 10 ml, A 1.00 mg/l, 2.00 mg/l, A sample	3, .02
Mn Total .00 mg/l		NO_3 ml std. 10 ml, .300 A sample, A ml std, A ml std Factor	3, .06
Dissolved mg/l		NO_2 ml mg/l, A 0.01 mg, .02 mg, .05 mg, Sample	
Ca 5.05 25 ml	101		
Mg	44	PO_4 ml Ortho Total, A 0.0050 mg, .0100 mg, .0250 mg, .0500 mg, Sample	
Na		Total anions	
Na + K Calc.	217	Milliequivalents per liter: Na+K — Cl; Ca — HCO_3+CO_3; Mg — SO_4	
K			
Percent error, Total cations			

B, A, mg, mg, mg, mg	
Al; Fe .04; Mn .00	.00
Cu; Pb; Zn	
Dissolved solids: Determined; Calculated	38[illegible]
Hardness 25 ml, 6.75 me/l Ca + Mg, 13.48 me/l Alk, me/l NCH	Ca+Mg 27[illegible]; NCH
Color	Card No.
Br; I	
Alk. as $CaCO_3$; Free CO_2	
Percent Na 10; SAR .7; RSC 3	
MBAS; NO_3	Card No.

Analyzed by L. HOBBS LUPE HAGOOD Checked by LLL MCH
Date begun OCT 3 1 1968 Completed NOV 5 1968

Transmittals	Date
Records processing	
Collector	
Owner X	

Recorded by Punched by

3-4 mi W ... PS
14434' NA ... NA 1953
1440

WRD Exp. (LW)
April 1960

Well No. YY 59- 53 401

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

1:24,000

MASTER CARD

Record by W SANDEEN Source of data MRS LANGE Date 10-17-68 Map BRENHAM, 1963

State TEXAS [4 9] County (or town) WASHINGTON [Y Y]

WHS Latitude: [3 0 1 0 3 5 N] N/S Longitude: [0 9 6 2 7 5 6] Sequential number: [1]

Lat-long accuracy: [1] T____ S, R____ W, Sec____

Local well number: [Y Y - 5 9 - 5 3 - 4 0 1] Other number: B&H "OLD WELL"

Local use: [ ] Owner or name: ROBERT LANGE

Owner or name: [R O B E R T L A N G E] Address: BOX 506 BRENHAM

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [P]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — SUPPLEMENT NEW WL 60+ PROD. OFFICE 20 HOUSES [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: [N] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: RPT 6-19-61 [Φ] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 434 ft [4 3 4] Meas. Rep. accuracy [6]

Depth cased: (first perf.) NA ft [ ] Casing type: STEEL Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: 1953± [9 5 3] Pump intake setting: 165 (?) ft [1 6 5]

Driller: ALFRED CONKLIN name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [J] Deep Shallow [ ]

Power (type): diesel, elec., gas, gasoline, hand, gas, wind; H.P. 3 [T] Trans. or meter no.

Descrip. MP ____ ft above below LSD, Alt. MP

Alt. LSD: 422' [4 2 2] Accuracy: (source) [4]

Water Level ____ ft above below MP; Ft above below LSD [ ] Accuracy: [ ]

Date meas: [ ] Yield: - gpm [ ] Method determined [ ]

Drawdown: ____ ft [ ] Accuracy: [ ] Pumping period ____ hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduc: ____ K x 10^6 [ ] Temp. ____ °F [ ] Date sampled [ ]

Taste, color, etc.

UTM

Well No. YY-59-53-401

Well No. YY - 59 - 53 - 401

Latitude-longitude 30 10 35 96 27 56
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: 03 | Section:

E | Drainage Basin: 5 2 B | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — H

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

OLD WELL (LARGE WELL)

TEXAS STATE DEPT OF HEALTH

6-19-61

	ppm
Ca	96
Mg	7
Fe	.06
Mn	<.05
Na	26
CO_3	0
HCO_3	351
SO_4	8
Cl	22
F	0.2
NO_2	2.0

SPECIFIC CONDUCTANCE 618

CALC TDS 371

Phenolphthalein $CaCO_3$ ALKALINITY 0

TOTAL ALKAL. $CaCO_3$ 285

TOTAL HARDNESS 271

Analysis in ppm made and submitted

GPO 857-700

Well No. YY-59-53-401

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas State Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TWDBE-GW ONLY
Program No.
Proj. No.

59-53-401

CHEMICAL WATER ANALYSIS REPORT

County YY WASHINGTON
State Well No. 59 53 401
Well No.
Date Collected 06 19 61
By

Send report to:

Ground Water Division
Texas Water Development Board
P.O. Box 13087
Austin, Texas 78711

Location
Source (type of well) Owner Robert Lange
Date Drilled Depth 434 ft. WBF
Producing intervals Water level ft.
Sampled after pumping hrs. Yield GPM meas./est. Temperature °F °C
Point of collection Appearance ☐ clear ☐ turbid ☐ colored ☐ other
Use Remarks

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. Date Received Date Reported

	MG/L	ME/L
Silica	61.8	
Calcium	96	
Magnesium	7	
Sodium	26	
Total		
☐ Potassium		
☐ Manganese		%Na
☐ Boron		SAR
3/ ☐ Total Iron		RSC

☐ (other) MG/L

Specific Conductance (micromhos/cm3)

Diluted Conductance (micromhos/cm3) X

	MG/L	ME/L
Carbonate		
Bicarbonate	351	
Sulfate	8	
Chloride	22	
Fluoride	0.2	
Nitrate		
pH		Total

1/ Dissolved Solids (sum in MG/L) 371

Phenolphthalein Alkalinity as $CaCO_3$ 288

Total Alkalinity as $CaCO_3$

Total Hardness as $CaCO_3$ 271

2/ Nitrogen Cycle
Ammonia - N
Nitrite - N
Nitrate - N
Organic Nitrogen

"☐" items will be analyzed if checked.

1/ The bicarbonate reported in this analysis is converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure is used in the computation of this sum.
2/ Nitrogen cycle requires separate sample.
3/ Total iron requires separate sample.

TWDBE-GW-50 (Rev. 7-1-71)

Analyst Checked By

Geological Survey — UNITED STATES DEPARTMENT OF THE INTERIOR — Ground Water Analysis — Water Resources Division, Austin, Texas

Texas State Dept. of Health (taken from back of well schedule)

State: Texas 4 9 County: WASHINGTON Y Y Well No. Latitude 3 0 1 0 3 5 N Longitude 0 9 6 2 7 5 6 Seq. No. 1 Date M D Y 0 6 1 9 6 1 Sampling Depth Type

Local Well No. YY-59-53-401 Location

Owner: Robert Lange Date drilled: Depth: 434 WBF Prod. intervals KEY PUNCHED Water level

Sampled after pumping Yield GPM Pt. of coll. Appearance Use Collector

Field	Value	Field	Value	Field	Value
Specific conductance (R KCl, R sample, x 10( ))	618	HCO_3 mg/l (Total Alk as CO_3)	351	B	
pH		CO_3		Al	
Temperature °C		SO_4	8	Fe	.06
Density at 20°C		Cl	22	Mn	<.05
SiO_2		Source	6	Cu	
		Card No.	0	Pb	
Fe (Sample Total mg/l, Sample Diss. mg/l)		F	0.2	Zn	
Mn (Total mg/l, Dissolved mg/l)		NO_3		Dissolved solids: Determined	
Ca	96	NO_2		Dissolved solids: Calculated	371
Mg	7	PO_4 (Ortho, Total)		Hardness Ca+Mg	271
Na	26	Total anions		NCH	
Na + K Calc.				Color	
K				Br	
Percent error				I	
Total cations				Alk. as $CaCO_3$	288
				Free CO_2	
				Percent Na	
				SAR	
				RSC	
				MBAS	
				NO_2	

A C.00250 mg, .00625 mg, .0125 mg, .025 mg, Sample

Fe A 0.025 mg

NO_3 A sample, A ml std, A ml std, Factor

NO_2 A 0.01 mg, .02 mg, .05 mg, Sample

PO_4 A 0.0050 mg, .0100 mg, .0250 mg, .0500 mg, Sample

Milliequivalents per liter: Na+K — Cl; Ca — HCO_3+CO_3; Mg — SO_4

Hardness: me/l Ca + Mg, me/l Alk, me/l NCH

Card No. R; Card No. S

Analyst ____ Checked by ____
Date begun ____ Completed ____

Transmittals	Date
Records processing	
Collector	
Owner	

Recorded by: ____ Punched by: ____ Date: ____

623900 R ?

2-3 mi SSW dormant
NA

WRD Exp. (GW)
April 1966

Well No. 59-53-802

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

1:24,000

MASTER CARD

Record by: W. SANDEEN Source of data: OWNER Date: 9-15-68 Map: BRENHAM, 1963

State: TEXAS [48] County (or town): WASHINGTON [YX]

Latitude: [30 09 45 N] Longitude: [096 27 04] Sequential number: [1]

Lat-long accuracy: [1] T ____ S, R ____ , Sec ____

Local well number: [YX-59-53-802] Other number:

Local use: Owner or name: VERNON WHITMARSH

Owner or name: [V. WHITMARSH] Address: CITY CARD ... BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [P]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [H]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 10-17-68 [0] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [A]

Freq. sampling: 10-17-68 [0] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 457 ft [457] Meas. rept. accuracy [3]

Depth cased (first perf.): N.A. ft [ ] Casing type: STEEL ; Diam.: 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: Aug 1965 [965] Pump intake setting: 189 ft [189]

Driller: T & S DRILLING Co.

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep / Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 1 [T] Trans. or meter no.

Descrip. MP: TOP CASING +1.2 ft above below LSD, Alt. MP

Alt. LSD: 405 ± [405] Accuracy [4]

Water Level: 128.34 ft above below LSD [127] Accuracy: [A]

Date meas.: 10-17-68 [068] Yield: gpm [ ] Method determined [ ]

Drawdown: ft [ ] Accuracy: [ ] Pumping period hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10⁶ [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

128.34
1.2

149

Well No. YY - 9-53-802

Latitude-longitude 30 09 49 S 96 27 04
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage Basin: 528 Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat S

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TDWR ONLY

Organization No. ______ Lab No. 02

Work No. ______

CHEMICAL WATER ANALYSIS REPORT

County 239 WASHINGTON

State Well No. 59-53-802

Well No. ______

Date Collected 10-17-68

Send report to:

Data Collection and Evaluation Section
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711

Location 2 MI W OF BRENHAM, TEXAS Sample No. ___ By W. SANDEEN - USGS

Source (type of well) ______ Owner VERNON WHITMARSH

Date Drilled 1965 Depth 457 ft. WBF —

Producing intervals — Water level — ft. Sample depth ___ ft.

Sampled after pumping 30 MIN Yield 9 GPM meas./est. Temperature ___ °F ___ °C

Point of collection HOSE FROM HYDRANT IN YARD Appearance ☒ clear ☐ turbid ☐ colored ☐ other

Use DOM. Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

Constituent	Code	MG/L	ME/L
Silica	00955		
Calcium	00915		
Magnesium	00925		
Sodium	00929		
Total			
☐ Potassium	00937		
[3] ☐ Manganese	01055		
☐ Boron	01022		
[3] ☐ Total Iron	01045		
☐ (other) ______ MG/L			

%Na ______

SAR ______

RSC 2.5

Specific Conductance (micromhos/cm3) 00095 616

Diluted Conductance (micromhos/cm3) X

" ☐ " items will be analyzed if checked.

Constituent	Code	MG/L	ME/L
Carbonate	00445	0	.00
Bicarbonate	00440	347	
Sulfate	00945	14	.29
Chloride	00940	22	
Fluoride	00951		
Nitrate	71850		
pH	00403		
Total			
[1] Dissolved Solids (residue at 180°C)	70300		
Phenolphthalein Alkalinity as $CaCO_3$	00415		
Total Alkalinity as $CaCO_3$	00410		
Total Hardness as $CaCO_3$	00900		272
[2] Nitrogen Cycle			
Ammonia - N	00610		
Nitrite - N	00615		
Nitrate - N	00620		
Organic Nitrogen	00605		

[1] The bicarbonate reported in this analysis can be converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure used in the computation of dissolved solids.
[2] Nitrogen cycle requires separate sample.
[3] Total Iron and Manganese require separate sample.

Analyst

Geological Survey — UNITED STATES DEPARTMENT OF THE INTERIOR — Ground Water Analysis — Water Resources Div., Austin, Texas

City Carrier #2
Brenham, Texas

'00059

State: Texas 4|8 County: Washington YY Well No. Latitude 300949N Longitude 0962704 Seq. No. 1 Date M D Y 10 17 68 Sampling Depth Type

Local Well No. YY-59-53-802 Location 2 mi. west of Brenham, Texas
Owner: Vernon Whitmarsh Date drilled: 1965 Depth: 457' WBF
Sample after pumping 30 min. Yield 9 GPM Pt. of coll. Hose from hydrant in yard Appearance Clear
Prod. intervals
KEY PUNCHED
Use Dom.
Static 128.34' bl
M.P. 1.2' abv. L
Water level 405
Collector W. Sandeen

Field	Value
K × 10⁶	R KCl 204, R sample 331 — 616
pH	6.9
Temperature °C	
Density at 20 C	
SiO_2	
Al	
Fe	
Mn	Total .00 mg/l
Ca	
Mg	
Na	
Na + K calc	
K	
Percent error / Total cations	
HCO_3	50 ml, 17.35 — 347
Total Alk as CO_3	
CO_3	50 ml — 0
SO_4	10 ml, Sample .70 — 14
Cl	50 MM ml, 2.18 — 22
Source 79 / Card No. 80	0
F	
NO_3	
NO_2	
PO_4	
Total anions	
B	
Al / Fe / Mn	Fe .00, Mn .00
Cu / Pb / Zn	
Dissolved solids: Determined / Calculated	
Hardness	25 ml, 6.80 me/l Ca + Mg — Ca+Mg 3.7
me/l Alk / me/l NCH	NCH
Color	
Br / I	
Alk. as $CaCO_3$ / Free CO_2	
Percent Na / SAR / RSC	RSC .2
MBAS / NO_3	

Milliequivalents per liter: Na+K — Cl; Ca — HCO_3+CO_3; Mg — SO_4

Analyst LUPE HAMES Checked by [illegible] MH
Date begun OCT 31 1968 Completed NOV 1968

Transmittals / Date
Records processing
Collector X
Owner

Recorded by: Punched by:

APPENDIX C

Quality Assurance Project Plan

TNRCC

Protecting Texas by Reducing and Preventing Pollution

Quality Assurance Project Plan

for

Texas Natural Resource Conservation Commission Preliminary Assessment/Site Inspection Program (FY 1996)

Prepared in cooperation with the U.S. Environmental Protection Agency

September 1995

Quality Assurance Project Plan

Texas Natural Resource Conservation Commission
Preliminary Assessment/Site Inspection
Program (FY 1996)

Prepared in cooperation with the

U.S. Environmental Protection Agency

September 1995

The preparation of this report was financed through a grant from the U.S. Environmental Protection Agency.

QTRACK # __________

QUALITY ASSURANCE PROJECT PLAN
FOR
TNRCC PRELIMINARY ASSESSMENTS AND SCREENING SITE INSPECTIONS

TNRCC Concurrence:

DeAnna Epperson — 01/09/96
DeAnna Epperson
Texas Natural Resource Conservation Commission
QA/QC Program Officer
Date

Allan M. Seils — 01/09/96
Allan M. Seils
Texas Natural Resource Conservation Commission
Program Manager
Date

Wesley G. Newberry — 1/9/96
Wesley G. Newberry
Texas Natural Resource Conservation Commission
Technical Director
Date

TNRCC Approval for Implementation:

Sheila Meyers — 2/2/96
Sheila Meyers
Texas Natural Resource Conservation Commission
QA Specialist
Date

EPA Concurrence:

Bart Cañellas 6SF-RA — 2/15/96
Bartolomé J. Cañellas
U.S. Environmental Protection Agency, Region 6
Site Assessment Manager for Texas
Date

Stacey Bennett — 02/26/96
for Ed Sierra
U.S. Environmental Protection Agency, Region 6
Head, Site Assessment Team
Date

EPA Approval for Implementation:

Robert R. Broyles — 3/7/96
Robert R. Broyles
U.S. Environmental Protection Agency, Region 6
Chief, Site Response Section
Date

TABLE OF CONTENTS

FIGURES

TABLES

REFERENCES

Interim Draft EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, May 1994

EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

USEPA Contract Laboratory Program Statement of Work for Inorganics Analysis, Document No. ILM04.0

USEPA Contract Laboratory Program Statement of Work for Organics Analysis, Revision No. OLM03.1, August, 1994

QAPP DISTRIBUTION LIST

Name	Organization
Bartolomé J. Cañellas Site Assessment Manager	U.S. Environmental Protection Agency, Region 6 Site Response Section
Wesley G. Newberry, Technical Director	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Allan M. Seils, Program Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
DeAnna Epperson, QA/QC Program Officer	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Kelly Cook, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Debra Hendricks, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Abigail Power, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Moira McCarthy, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
C. Todd Counter Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Johnny Kennedy Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program Region 10/12 (Beaumont/Houston) Offices
J.D. Thompson, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program Region 4 (Arlington) Office
Gary Hazelwood, Site Investigation Manager	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program Region 5/10 (Tyler/Beaumont) Offices
Four Staff Positions Site Investigation Managers	TNRCC, Pollution Cleanup Division Superfund Site Discovery and Assessment Program
Sheila Meyers QA Specialist	TNRCC, Administrative Services Organizational Development and Training

SECTION 1

PROJECT MANAGEMENT

(A4) PROJECT ORGANIZATION and (A6) PROJECT DESCRIPTION

This document is a Quality Assurance Project Plan (QAPP) for the planning and implementation by the Texas Natural Resource Conservation Commission (TNRCC) of Preliminary Assessments and Screening Site Inspections in Texas for the U.S. Environmental Protection Agency (EPA). This QAPP serves as a controlling mechanism to ensure that all data collected are of satisfactory quality. This QAPP has been prepared in accordance with the "Interim Draft EPA Requirements for Quality Assurance Project Plans ", EPA QA/R-5, May 1994, and EPA Data Quality Objectives Process for Superfund, EPA QA/G-4, September 1994.

The TNRCC Site Investigation Manager will be responsible for collecting the samples defined in the Screening Site Inspections (SSI) or Expanded Site Investigation (ESI) Work Plan (WP), initiating the proper chain-of-custody, health and safety, and quality assurance procedures. The TNRCC Site Investigation Manager will also be responsible for making any field sampling determinations as dictated by site conditions. Samples from the sites will be analyzed for semi-volatiles, volatiles, metals, pesticides and Polychlorinated Biphenyls (PCBs).

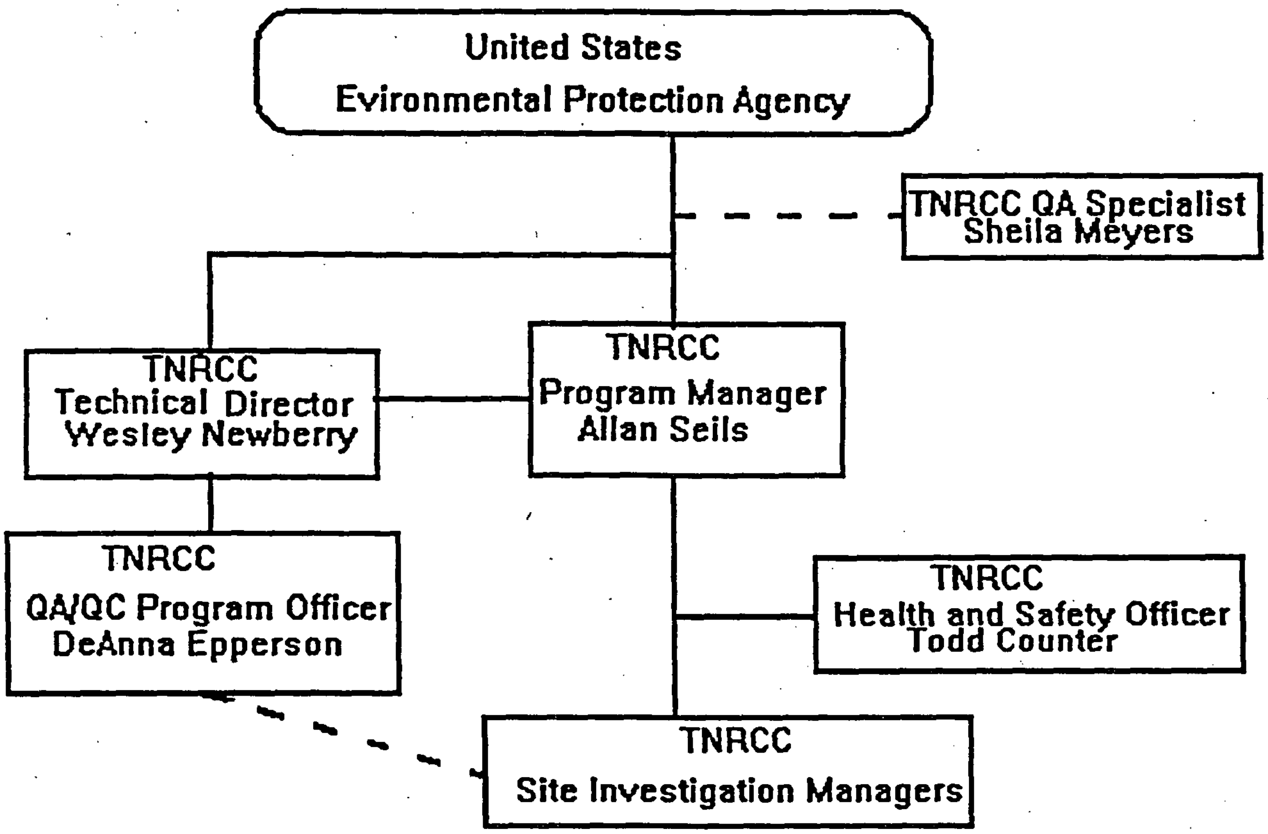
If, considering site conditions, there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes which are readily accessible on-site, the EPA will be notified no later than one (1) day after the inspection team returns from the site visit. Written notification will follow any verbal communication in this regard.

The Preliminary Assessments and Site Investigation (PA/SI) program organization chart, Figure 1.1, identifies the key individuals who will be primarily responsible for performance of the project. This organizational structure forms a management team of professionals to oversee the technical aspects of the project, supported by an administrative team who will ensure that personnel and equipment are available to the project when required.

Allan M. Seils, will function as TNRCC Program Manager. Mr. Seils will be responsible for overall coordination of project activities. He also will serve as primary TNRCC contact for the EPA. The Technical Director, Wesley G. Newberry, will review the SSI work plans, Preliminary Assessment (PA) and SSI reports, and progress reports. DeAnna Epperson, the Program QA/QC Officer, will be responsible for reviewing data in accordance with the procedures outlined in this QAPP, and will complete associated data assessment reports. The Program QA/QC Officer will function independently of the Program Manager and will assure

Figure 1.1 Program Organization

Preliminary Assessment/Site Inspection Program
Superfund Site Discovery and Assessment Unit



that project quality control is maintained. The TNRCC Program Quality Assurance/Quality Control (QA/QC) Officer shall audit the field work at 20% of the SSI/ESI sites. Sheila Meyers is the Quality Assurance Specialist and will serve as TNRCC final approval authority for this PA/SI QAPP. C. Todd Counter will serve as the Health and Safety Officer, independent of the Program Manager. As such, he, or his designee will be responsible for ensuring that all on-site activities comply with the approved site specific Health and Safety Plan.

A generic Health and Safety Plan (H&SP) will be followed during performance of each PA site visit. Individual site H&SPs will be prepared for all SSI sites as part of the work plan development. All H&SPs will be based on TNRCC's health and safety program and TNRCC's understanding of current health and safety regulations.

There will be no more than twelve (12) PAs and eighteen (18) SSIs conducted during this project with the possibility that both a PA and SSI may be conducted at any one location. A maximum of two (2) persons per PA and four (4) persons per SSI/ESI will be used to conduct field activities. At these sites, one TNRCC staff person will be designated as the lead Site Investigation Manager and will have the on-site responsibility for ensuring that the HSP and QAPP are followed, and that appropriate data are collected to allow for preparation of site-specific SSI/ESI WP. The Site Investigation Manager also will be responsible for planning and conducting the site visit and preparing the final PA, SSI report and/or Documentation Record (for ESI sites, only) for the site.

It is anticipated the TNRCC Program Manager will issue site assignments such that the majority of PAs are completed within the first six (6) months of the project. This will allow those sites which progress directly to an SSI Work Plan to be completed within the final six months of the project. The total anticipated time to complete each PA is 120 hours and each SSI is 400 hours. A detailed schedule is presented in Table 1.2. This schedule may be adjusted to meet specific requirements of the EPA guidance.

The TNRCC Site Investigation Manager designated to lead investigations at the SSI/ESI site will develop a WP and sampling strategy for the site. The information gained from the PA, tentative disposition, and other timely information will be used in determining tentative numbers, nature, and location of samples collected. The WP consists (1) a list of project contacts; (2) a site background review including site history, descriptions of the site including geology, hydrology, soil conditions, site map(s), and waste handling practices including types and quantities of wastes generated (if known); (3) a WP summary including field personnel, site reconnaissance plan, sampling strategy, sampling locations and map(s), and QA/QC sample protocols and

Table 1.2. Schedule of Preliminary Assessments

Activity	Hours After Site Assignment
Site Assignment	0
Draft Preliminary Assessment Scoresheets and Background Research	60
Conduct PA Site Visit	12
Compute PREscore for Site	8
Draft PA Report Complete	30
Final PA Report Submitted to EPA	10

Table 1.3. Schedule of Site Inspections

Activity	Hours After Site Assignment
Site Assignment to TNRCC	0
SSI Background Research Completed	68
Work Plan Completed and Approved	60
Health and Safety Plan Completed and Approved	18
Work Plan Executed (includes travel)	123
Laboratory Analyses Complete	40
Draft SSI Report Complete	75
Final SSI Report Submitted to EPA	16

decontamination procedures. The WP will also identify potential targets for the groundwater, surface water, soil exposure, and air pathways; (4) a health and safety plan to describe potential hazards and necessary site specific precautions and preparations for completing the field work described in the sampling plan; and (5) general project requirements such as a schedule, equipment needed, and mobilization/demobilization procedures.

The TNRCC will prepare the WP according to the format agreed to by the EPA for use on the FY'92 SSI Scope of Work. Revisions to this format will be determined by the EPA and TNRCC project managers prior to preparing the first documents. The EPA will be responsible for approving each work plan, however, the decision to proceed with WP implementation may be delegated by the EPA Site Assessment Manager (SAM) to the TNRCC Program Manager, as appropriate.

Subcontractors will be used to assist in report photographic production services. Other needs for subcontractor services will be determined throughout the course of this project. EPA shall choose a laboratory to be used for this project under its Contract Laboratories Program (CLP) and shall incur all costs for sample analyses. The EPA Houston's Laboratory shall provide analytical support for drinking water samples. The sample analyses shall include analysis for all constituents listed on the CLP Routine Analytical Services (RAS) Organic Target Compound List (TCL) and Inorganic Target Analyte List (TAL).

Control of subcontractor work quality, schedules, and budgets will be assured by the following means:

- To assure accountability on a personal level and to avoid the problems associated with diffused responsibilities, the subcontractor will designate a single individual who will function as the subcontractor's project manager.

- The subcontractor's project manager will report directly to the TNRCC Site Investigation Managers.

- The subcontractor will establish and maintain a system of controls to ensure that the objectives indicated in the project QA/QC plan will be accomplished. TNRCC personnel will periodically inspect this system of controls to ensure compliance by the subcontractor.

- The subcontractor will specify that the TNRCC Site Investigation Manager has the authority to remove any subcontractor personnel from the project if he or she is not performing satisfactorily.

(A5) PROJECT DEFINITION/BACKGROUND

The major objective of this project is to perform and complete Preliminary Assessments and Screening Site Inspections at sites judged to be potentially hazardous because of current and past operational and waste disposal activities. The PA and SSI reports will provide technical information and data that can be used to determine the score of each respective site according to the Hazard Ranking System.

Preliminary Assessments (PA) and Screening Site Inspections (SSI) will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS), Final Rule, dated December 14, 1990. The EPA furnished guidance for performance of these tasks and it will be used as reference material in collecting data, planning, and conducting on-site activities, and in preparation of the reports for each site. This guidance currently includes the following references: (1) *Federal Register,* 40 CFR Part 300, December 14, 1990; (2) "Guidance for Performing Preliminary Assessments Under CERCLA" September, 1991; 3) "Guidance for Performing Site Inspections Under CERCLA", September, 1992; 4) "Regional Quality Control Guidance for NPL Candidate Sites", December, 1991; 5) "Region 6 CLP Training Manual", October, 1993; and 6) Management of Investigation-Derived Wastes During Site Inspections", May, 1991.

In most cases, it will be necessary to obtain advance permission to inspect the sites. The TNRCC will obtain access agreements for each site. The designated TNRCC Site Investigation Manager for each site will prepare a written notification to the site owner/operator of the impending site visit, followed by telephone confirmation by the TNRCC Site Investigation Manager. The TNRCC Site Investigation Manager will also be responsible for notifying the local the TNRCC Regional Office of the impending site visit. The TNRCC Program Manager will provide each member of the TNRCC project staff with written credentials describing the nature of the project and the authority under which it is conducted.

Upon arrival at a site, the inspection team will conduct an initial survey of the site to ensure adequate safety precautions are in place during site activities. The Site Investigation Manager will, when possible, conduct a detailed interview with site representatives. Interviews with other individuals familiar with the site will be conducted as appropriate before, during, or after on-site reconnaissance activities.

A thorough site reconnaissance, if possible, will be conducted at each site. The inspection team will visually survey and document the location of the site relative to any roads or other access, drainage systems, surface waters, nearby structures, drums, tanks, monitoring wells, facility boundaries, unique geological features, and other factors which may affect pollutant migration pathways. These factors will be recorded, to the extent practical, on a field site sketch which will be prepared during the site visit. The facility sketch also will document the location of sensitive environmental receptors such as on-site and off-site homes and public building, natural areas, and drinking water supplies. Residences within 400 yards of the site will be included in the site sketch. Indicators of existing problems, such as areas of diseased, dying, or distressed vegetation or discolored soil, also will be noted on the site sketch. Photographs will be taken as necessary to document observations and on-site activities. Generalized population information, including collection of environmental equality data, will be based on the number and types of surrounding homes and businesses.

Where operator records are present, these will be reviewed for an indication of the type and quantity of materials disposed of at a given site. Where possible, the party responsible for waste disposal will be determined.

For SSI/ESI visits, environmental samples will be collected in accordance with the approved WP to provide site-specific data on the hazardous substances present as well as pollutant dispersal pathways. The samples collected during the SSIs and ESIs typically will be from the following sources:

o On-site and off-site soils;
o Groundwater from existing potable or agricultural water or monitoring wells;
o Water or waste from open drums, surface impoundments, or evaporation pits;
o Point of entry into receiving waters in the runoff pathway(s) from the site;
o Environmentally sensitive areas near the site.

For each PA, initial activities will involve the collection of site background information and completion of a site visit. A Regional EPA site assessment representative will accompany TNRCC personal on the PA site visit and based solely on the field findings an immediate decision will be made on whether to proceed with preparation of an SSI Work Plan. On those occasions when no EPA site assessment representative is present, the TNRCC PA/SI Program Manager, Technical Director and designated Site Investigation Manager (with EPA follow up concurrence) will decide if the site should proceed to the SSI stage.

If a site is designated to proceed to the SSI phase, than an SSI Work Plan and final SSI Report will be prepared for submission to the EPA. A complete PA will not be prepared for these sites. An abbreviated PA Report will be prepared for those PA candidate sites which are determined ineligible for CERCLA response by the EPA site assessment representative.

For each SSI, field activities will be conducted in two steps. TNRCC will collect information needed to prepare a work plan before the site visit. Following approval of the work plan, TNRCC will visit the site to execute the work plan, including sampling activities. The collected information, including sample results, will be compiled into a final SSI Report for the site.

Initial preparations for each PA, SSI and ESI site visit will involve obtaining information for preparation of the Health and Safety Plan and SSI/ESI WP. This task also includes obtaining access to the sites and the site inspection visit. Prior to any on-site inspections, the project staff and the TNRCC Program Manager will review the results of the preliminary assessment and/or available EPA and/or TNRCC files to address any health and safety risk concerns, and to assess the level of effort necessary to perform the site visit.

The TNRCC project staff will conduct a detailed background study for each PA/SSI/ESI site prior to any field activities. The purpose of this study is to collect available file information concerning activities at the site, hydrogeologic, photographic and topographic in formation pertinent to the site (to be used in pathway evaluation), and population and ecological information available for the area surrounding the site (to be used in a target evaluation).

Site activities information to be collected during this background study will be primarily the EPA, TNRCC, and other State and Federal agency records on the site. Hydrogeologic and topographic information will be collected at this time primarily from USGS topographic maps, city and county maps, county and regional water reports, county and regional geologic cross sections, state well construction records, soil maps, etc. Population and ecological information will be collected primarily from census figures, USGS topographic maps, public school records, the Texas Manufacturers Index, U.S. Fish and Wildlife and Texas Parks and Wildlife endangered species publications, and additional information if available. Aerial photography, as available from the Texas Natural Resources Information System, Texas Department of Transportation, and other sources, will also be examined for additional information about the site.

The data collected will, whenever possible, be selected to meet the requirements of the HRS model. It is understood that, at the level of effort appropriate for a PA, it may not be possible at some sites to collect "HRS quality" data to fulfill every requirement of the model. The TNRCC will make every reasonable effort to collect "HRS quality" data for every site, within the limits of the project schedule, budget, and the available information. Every effort will be made to collect the best available information during the performance of each PA. In addition, all SSI/ESI information will be collected in accordance with applicable SI guidance.

The level of effort required for the SSI background research may be greater than that normally required. This increased effort is necessary because the PAs for some of the sites may not have been prepared prior to publication of the current HRS guidance and do not contain complete HRS information. Therefore, this additional PA information may need to be collected during the background study task of the SSI/ESI.

(A7) DQO for MEASUREMENT DATA

A quality assurance (QA) program is essential to assure the quality, controllability, accountability, and traceability of the work being performed for the TNRCC PA/SI Program. Quality assurance encompasses all actions taken by TNRCC and its subcontractors to achieve results which are accurate, reliable, and legally defensible for all aspects of the project. TNRCC and its subcontractors will adhere to the quality assurance procedures outlined herein and will rigorously implement the QA program throughout the duration of the project.

The primary goal of this QA program is to ensure the accuracy and completeness of the data which ultimately will be used to score and to determine the status of the sites that are investigated. In order to achieve this accuracy and completeness, it is necessary that all sampling, analysis, and data management activities be conducted in accordance with preset standards, and that these activities be reviewed regularly to maintain full compliance with the standards. This program has been designed so that corrective action can be implemented quickly if necessary without causing undue expense or delay to the project. The standards and review procedures which TNRCC will use to attain optimum accuracy and completeness of data are outlined in this plan. All subcontractors to TNRCC will be required to follow these standards and procedures, at a minimum.

The quality assurance objectives for all measurement data include considerations of precision, accuracy, completeness, representativeness, and comparability. Compliance with the QA objectives will be judged individually for each site. QC objectives stated in the EPA CLP Statement Of Work (SOW) are presented in Tables 1.4 and 1.5.

Table 1.4. Matrix Spike/Matrix Spike Duplicate Control Limits for CLP GC/MS Organic Analyses

	Water		Soil	
Matrix Spike Compound	% Recovery	RPD %	% Recovery	RPD %
Volatile organics:	61-145	14	59-172	22
1,1-Dichloroethene	71-120	14	62-137	24
Trichloroethene	76-127	11	66-142	21
Benzene	76-125	13	59-139	21
Toluene	75-130	13	60-133	21
Chlorobenzene				
Semivolatile organics				
Phenol	12-110	42	26-90	35
2-Chlorophenol	27-123	40	25-102	50
1,4-Dichlorobenzene	36-97	28	28-104	27
N-Nitroso-di-n-propylamine	41-116	38	41-126	38
1,2,4-Trichlorobenzene	39-98	28	38-107	23
4-Chloro-3-methylphenol	23-97	42	26-103	33
Acenaphthene	46-118	31	31-137	19
4-Nitrophenol	10-80	50	11-114	50
2,4-Dinitrotoluene	24-96	38	28-89	47
Pentachlorophenol	9-103	50	17-109	47
Pyrene	26-127	31	35-142	36
Pesticides:				
gamma-BHC	56-123	15	46-127	50
Heptachlor	40-131	20	35-130	31
Aldrin	40-120	22	34-132	43
Dieldrin	52-126	18	31-134	38
Endrin	56-121	21	42-139	45
4,4'-DDT	38-127	27	23-134	50

Table 1.5 Surrogate Spike Control Limits
for CLP GC/MS Organic Analyses

Surrogate Compound	Soil/Sediment % Recovery	Water % Recovery
Volatile organics:		
1,2-Dichloroethane-d4	70-121	76-114
4-Bromofluorobenzene	59-113	86-115
Toluene-d8	84-138	88-110
Semivolatile organics:		
Nitrobenzene-d5	23-120	35-114
Terphenyl-d14	18-137	33-141
2-Fluorobiphenyl	30-115	43-116
2-Fluorophenol	25-121	21-110
2,4,6-Tribromophenol	19-122	10-123
Phenol-d5	24-113	10-110
2-Chlorophenol-d4	20-130*	33-110*
1,2-Dichlorobenzene-d4	20-130*	16-110*

* These limits are for advisory purposes only.

PRECISION

The precision of a measurement is an expression of mutual agreement of multiple measurement values of the same property conducted under prescribed similar conditions. Precision is evaluated most directly by recording and comparing multiple measurements of the same parameter on the same exact sample under the same conditions or a matrix spike and matrix spike duplicate. It is usually expressed in terms of the relative percent difference (RPD). The RPD can be evaluated both internal (laboratory duplicates) and external (field duplicates) to the laboratory. Laboratory duplicate control limits for organics are method and laboratory specific, and will be evaluated as part of the EPA-CLP data validation. For metals analysis, a control limit of 20 percent RPD will be used for matrix spike and matrix spike duplicate sample values greater than or equal to 5 times the contract required detection limit. For field duplicates, a RPD of 50 percent will be used as the objective of precision.

Field measurements will be taken of pH, conductivity, temperature, water level, and organic vapor concentration based on HNU[2] or OVA[3] readings. The objective for precision of field data collection methods is to achieve and maintain the factory specifications for the field equipment. For the pH meter, precision will be tested by multiple readings in the medium concerned. Consecutive field measurement readings should agree within 10% RPD, and within 0.1 pH standard units after the instrument has been field calibrated with standard (NIST-traceable) buffers.

The water level indicator readings will be precise within 0.01 foot for duplicate measurements. The HNU or OVA will be calibrated each day prior to field use. If calibration readings deviate 15 percent or more from the concentration of the calibration gas, the instrument will be recalibrated.

ACCURACY

The degree of accuracy of a measurement is based on a comparison of the measured value with the actual true value. Accuracy of an analytical procedure is best determined based on the recoveries of matrix spike, matrix spike duplicate, and surrogate compounds.

The degree of accuracy and the recovery of analyte to be expected for the analyses of QC samples and spiked samples is dependent on the matrix, method of analysis, and the compound or element being determined. The concentration of the analyte relative to the method detection limit is also a major factor in determining the accuracy of the measurement. For metals analysis, spike recovery limits of 75-125 percent will be used. The QC acceptance ranges and limits for GC/MS organic analyses used to assess the accuracy of the data according to CLP protocol are presented in Tables 2.1 and 2.2. These QC acceptance ranges and limits may vary between laboratories and will be evaluated as part of the EPA-CLP data validation.

The objective for accuracy of field measurements is to achieve and maintain factory specifications for the field equipment. The pH meter is calibrated with buffer solutions traceable to National Institute of Standards and Technology (NIST) standards. The HNU or OVA will be calibrated daily with calibration gas.

REPRESENTATIVENESS

Samples taken must be representative of the population. All samples will be collected with dedicated equipment. All sampling equipment will be decontaminated prior to initiating sampling activities. Two types of blanks will be taken. The first type, a field blank, is a 40 milliliter VOA[4] vial filled with CLP-specified grade water. The vial will remain capped and accompany all samples for volatile organic analysis. One field blank (2 VOA vials) will be shipped with each container of appropriate samples. The second type is a rinsate blank and will consist of CLP-specified grade water that has been poured over the equipment after completion of decontamination. The types of blanks collected will be specified by the work plans for each site. The purpose of these blanks is to establish that proper sample bottle preparation, decontamination, and handling techniques have been employed. The blanks will not be counted for the laboratory's quality control protocol for matrix spikes or duplicate samples.

COMPARABILITY

Consistency in the acquisition, handling, and analysis of samples is necessary so the results may be compared with previous and future studies. Concentrations will be reported in a manner consistent with general practices. Standard EPA analytical methods and quality control will be used to support the comparability of analytical results with those obtained in other testing. Calibrations will be performed in accordance with EPA or manufacturer's specifications and will be checked with the frequency specified in the methods.

COMPLETENESS

The completeness of the data is measured as the amount of valid data obtained from the measurement system (field and laboratory) versus the amount of data expected from the system. The EPA-CLP data validation will determine the amount of valid data obtained from each site inspection. At the end of each SSI, completeness of data will be assessed and, if any data omissions are apparent, an attempt will be made to re-sample the parameters in question. The specific objective for the completeness of this project will be greater than or equal to 90 percent for field and laboratory data for each site.

ANALYTICAL PARAMETERS AND QUANTITATION LIMITS

The analytical parameters and their quantitation limits for use on this project will be determined on a per-site basis. All samples will be analyzed by CLP methods. The quantitation limits may vary since they are matrix and analyte dependent.

HOLDING TIMES

Holding times specified by EPA protocols will be set for samples collected under this program. Tables 1.6 and 1.7 list the types of analyses and their holding times.

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[2]HNU = systems photoionization detector
[3]OVA = organic vapor analyzer
[4]VOA = volatile organics analysis

Table 1.6 Holding Times* and Preservation for Aqueous Samples

Analysis	Extraction Times	Analysis Time	Preservation Method***
Volatile organics (VOA)	NA	7 days 14 days	cool, 4°C HCl to pH < 2 cool to 4°C
Semivolatile organics (BNA)	7 days	40 days after extraction	cool, 4°C
Pesticides/PCBs	7 days	40 days after extraction	cool, 4°C
Metals**	NA	6 months	HNO_3 to pH<2 cool, 4°C
Cyanide	NA	14 days	NaOH to pH>12 cool, 4°C

* Holding times begin at the time of collection.
** Except mercury, analysis time is 28 days.
***Preservation temperature may fluxuate by 2°C.

Table 1.7 Holding Times* and Preservation for Soil and Sediment Samples

Analysis	Extraction Times	Analysis Time	Preservation Method***
Volatile organics (VOA)	NA	14 days	cool, 4°C
Semivolatile organics (BNA)	14 days	40 days after extraction	cool, 4°C
Pesticides/PCBs	14 days	40 days after extraction	cool, 4°C
Metals**	NA	6 months	cool, 4°C
Cyanide	NA	14 days	cool, 4°C

* Holding times begin at the time of collection.
** Except mercury, analysis time is 28 days.
***Preservation temperature may fluxuate by 2°C.

(A9) TRAINING

A large percentage of TNRCC Site Investigation Managers have prior experience in conducting site investigations; however, all inspectors will undergo a formal training program. Major areas covered during the formal training project will be the objectives of the PA and SSI, preparation for inspection, legal ramifications, health and safety considerations, use of monitoring and sampling equipment in the field, sample shipment and chain-of-custody procedures, the appropriate procedures to be followed relative to any denial-of-entry problems encountered, and other aspects of the work to be performed under this project.

Each TNRCC employee involved in sample collection will be trained on how to collect representative samples from every medium which might be encountered. Project personnel will receive additional training in proper field documentation and in health and safety procedures. All training will be documented, and records will be maintained by the Program Manager.

(A10) DOCUMENTATION and RECORDS

Documentation Records will include documentation for all HRS factors evaluated. All assertions of fact will be referenced in the record.

All reports will be submitted to the EPA as they are completed. Any corrections or additions to the submitted material that the EPA deems necessary and appropriate will be made by the TNRCC within budget constraints. A PA, SSI/ESI WP, SSI Report, and Documentation Record will be deemed complete and final when the EPA approval is received, or within six (6) months of submittal, whichever comes first.

Following the site visits and completion of analytical work, the TNRCC will prepare a PA (Abbreviated) and/or SSI report or Documentation Record (for ESI sites only) highlighting significant findings for each site. The abbreviated PA Reports will be prepared in accordance with the requirements stated in the "Guidance for Performing Preliminary Assessments Under CERCLA", September 1991, Section 4.4 Abbreviated Reporting. The final SSI reports will be prepared in accordance with the report outlines approved by the EPA in Attachment P. Documentation Records will be prepared in accordance with current guidance and by using the companion WordPerfect® version of the Documentation Record. Should additional guidance become available prior to completion of this project, the TNRCC will evaluate the effect that conformance to this guidance will have on the schedule and budget, and will submit a revised schedule and budget to the EPA for approval.

The SSI reports will contain a description of the site, the operating history and nature of waste handling at the site, and a discussion of waste sources, pathway characteristics, and identification and description of potential human and environmental targets. In addition, the SSI report will contain a description of the data collected, analytical results, and QA/QC data. Supporting documents will be included in the SSI report as appendices and will consist of stratigraphic, hydrogeologic, and topographic information; a site sketch other pertinent maps; laboratory and chain-of-custody report originals; photographs; field notes; and reports from previous investigations at the site.

All data collected during each SSI/ESI visit will be validated using the most current EPA data validation guidelines and any EPA Regional instructions.

QUALITY ASSURANCE REPORT

A summary of all QA activities and findings during the course of this project will be reported to the EPA on a site specific basis with the final site inspection reports. Other project-related quality assurance items and corrective actions will be discussed in the monthly progress reports. These may include the following items:

1. Summary of QA management, including any changes
2. Measures of data quality from the project.
3. Significant problems related to work quality, and the status of any corrective actions implemented
4. Results of QA performance audits
5. Results of QA systems audits
6. Assessment of data quality in terms of precision, accuracy, completeness, representativeness, and comparability
7. Quality-assurance-related training
8. An assessment of indicators used in the project.

RECORD KEEPING

All information pertinent to PA site visits and SSI sampling activities will be recorded in a logbook. This book will be bound and have consecutively numbered pages. Entries in the logbook will be made in ink and will include, at a minimum, a description of all activities, the names of all individuals involved (sampling and oversight), date and time of sampling, weather conditions, any problems, and all field measurements.

SECTION 2

MEASUREMENT/DATA ACQUISITION

(B1) SAMPLING PROCESS DESIGN

After approval of the SSI work plan, the field activities will be executed. At each site, these activities may include shallow soil sampling, sediment sampling, surface water sampling, and groundwater sampling.

Detailed reports on all PA and SSI non-sampling data collection and SSI sampling activities will be kept in field logbooks. In this book will be noted the date, time, location, and identification of each sample, along with the collector's name, a description of all equipment used and any problems encountered, and general comments of the inspection team. Logbooks also are used to record pertinent information regarding the site itself, including date, time, location, and identification of all photographs taken during the site visit.

Proper identification and labeling of samples is crucial to an effective sampling program. Immediately upon collection, each sample must be sealed and tagged. The tag should be marked with a sample identification number, station location, type (composite or grab), concentration (low, medium, or high), the parameters requested, collector's name, and the date and time of sample collection.

For many of the SSIs, the determining factor of hazard evaluation will be the data provided by sampling and analytical activities. Thus, it is important that QA/QC be maintained for each sample. The purpose of this Section is to outline specific procedures for inspectors to use while acquiring and handling samples during an inspection to ensure that quality data are obtained.

EPA-certified clean sample bottles will be used for sample collection. Custody of these bottles will be maintained by documenting the batch number of the sealed box, documenting opening of the box, and keeping the bottles locked up at all times. If returned to the office, the bottles will be placed in a sealable container and secured with custody seals.

(B2) SAMPLE METHODS REQUIREMENTS

This Section discusses the standard sampling procedures. Other sampling procedures may be used as determined necessary by the lead Site Investigation Manager and with approval of the Technical Director or Program Manager.

Regardless of sample type, the following principles and procedures should be adhered to during the sample collection phase of a site inspection:

1. Obtain ice before visiting a site where sample collection is involved.

2. Add appropriate preservatives to the sample bottles at the time of sample collection. The bottles preservatives are required for each analysis are shown in Tables 2.1 and 2.2.

3. If there is reason to suspect the presence of toxic vapors, precede sampling activities by an initial survey of suspect areas, using appropriate safety gear and a photoionization detector (or equivalent). The potential use of air monitoring equipment should have been specified in the SSI Work Plan. If it was not, and if organic vapor presence is possible, contact the Program Manager and Project Safety Officer for possible changes in safety procedures.

4. If possible, collect background samples first, then proceed from the probable least contaminated to most contaminated sampling points.

5. Change disposable gloves between sampling points, placing used gloves in a plastic bag for disposal.

6. If it is necessary to reuse sampling devices, use the specified decontamination procedures between sampling points.

7. At each sampling location,
   a. Photograph the collection of samples.
   b. Record in the logbook:
   - Sample number;
   - Photo number;
   - Location (show on site sketch);
   - Type of sample;
   - Time; and
   - Relevant observations.

Table 2.1 Bottles Required for Aqueous Samples

Analysis	Required Volume	Container Type
Volatile Organics	80 mL	2 40-mL glass vials
Extractable Organics (BNA and pesticide/PCB)	1 gallon	2 80-ounce or 4 1-liter amber glass bottles
Metals	1 liter	1 1-liter polyethylene bottle
Cyanide	1 liter	1 1-liter polyethylene bottle

Table 2.2 Bottles Required for Soil and Sediment Samples

Analysis	Required Volume	Container Type
Volatile Organics	240 mL	2 120-mL widemouthed glass vials
Extractable Organics (BNA and pesticide/PCB)	6 ounces	1 8-ounce or 2 4-ounce widemouthed glass jars
Metals and Cyanide	6 ounces	1 8-ounce or 2 4-ounce widemouthed glass jars

8. If a facility representative requests, they will be allowed the opportunity to collect split samples. If these are desired, place samples directly in different containers at the sampling point rather than splitting them at a later time. In the event there may not be enough soil, sediment, and/or groundwater volume to provide split samples, collect the SSI required sample first and than provide the remaining volume to the facility representative.

9. If samples can be collected in a short period of time (less than 20 minutes), leave the cooler with ice at the car for convenience. Before placing samples in the iced cooler:

   a. Complete the sample tags and labels, and place clear tape over the sample labels on the sample containers to protect the writing from moisture.

   b. Double check the pH of all preserved water samples (exclusive of VOA samples).

   c. Place a custody seal around the bottle cap.

   d. Wrap the sample containers with plastic foam, bubble pack, or equivalent to protect against breakage.

   e. The TNRCC will include in each ice chest with samples to be shipped for analysis, a temperature blank taped to the side of the chest prior to shipping.

   f. Place the sample containers in plastic Ziploc® bags or equivalent to prevent melted ice from contacting the container.

   g. Place wrapped sample containers into ice chests filled with 2 to 3 inches of vermiculite.

10. Remove water from melted ice frequently, and replace with fresh ice. Place ice in plastic Ziploc® or sealable bags to minimize water leakage during shipment.

The following standard operating guidelines are presented for specific sample types.

GROUNDWATER WELL SAMPLING PROCEDURES

General

The primary consideration is to obtain a representative sample of the groundwater zone of interest without mixing the sample with stagnant (standing) water in the well casing.

To safeguard against collecting nonrepresentative stagnant water in a sample, the following guidelines and techniques will be adhered to during sample withdrawal:

1. As a general rule, all monitoring wells shall be pumped or bailed a minimum of three volumes of water in the well casing with three (3) consecutive consistent readings within 10% RPD for conductivity and temperature, and within 0.1 pH units before representative samples are withdrawn.

2. For wells that can be pumped or bailed to dryness with the sampling equipment, the well should be evacuated and allowed to recover to 85 percent of original water level before sample withdrawal.

3. The purge waters will be managed according to guidance provided in the "Management of Investigation-Derived Wastes During Site Inspections", May 1991. The preference is to leave both RCRA hazardous and non-hazardous investigation-devired wastes on-site whenever it complies with regulations and does not pose any immediate threat to human health and the environment.

Sampling, Monitoring, and Evacuation Equipment

Sample containers will conform to EPA regulations for the appropriate constituents.

The following equipment should be on hand when sampling wells:

1. Coolers for sample shipping and cooling, chemical preservatives, and appropriate packing cartons and filler.

2. Thermometer, pH paper and meter, camera and film, labels, appropriate keys (for locked wells), tape measure, water level indicators, and specific-conductivity meter.

3. Pumps. Pumps will normally be used to obtain samples, although samples may be obtained directly from the pump discharge line for high yielding monitoring wells and wells with dedicated pumps.

4. Bailers and monofilament line with tripod-pulley assembly (if necessary).

5. Decontamination solutions--tap water, distilled water, Alconox, isopropanol, CLP specified grade water.

Ideally, sample withdrawal equipment should be completely inert, economical to manufacture, easily cleaned, and reused, able to operate at remote sites in the absence of power resources, and capable of delivery variable rates for well flushing and sample collection.

Calculation of Well Volume

Calculations are to be made according to the following steps:

1. Obtain all available information on well construction (casing, screens, etc.).

2. Determine well or casing diameter.

3. Determine static water level (feet below ground level).

4. Determine depth of well.

5. Calculate number of linear feet of static water (total depth minus the static water level).

6. Calculate static volume in gallons: $V = Tr^2 (0.163)$, where T is linear feet of static water, and r is the inside radius of the well of casing in inches.

7. Determine the minimum amount to be evacuated before sampling.

If possible, a number of observations will be made when groundwater sampling is to take place. Some of the information can be gained from file review prior to a site inspection.

1. Note if monitoring wells are locked. Arrangements must be made to secure keys or to remove locks by other means and re-secure the wells.

2. Note the condition of the monitoring wells (i.e. casing, concrete pad, etc.).

3. Note well diameters to ensure that a pump and/or bailer of the proper size will be available. The diameter is also necessary for calculating the wells' static water volume.

4. Note the type of casing materials--PVC, steel, etc.

5. Note any observable physical characteristics of the groundwater as it is being sampled--color, odor, turbidity, etc.

6. Measure the static water level of each well before sampling, if possible. This is best accomplished with an electronic water level indicator. Similarly, determine the total depth of the well before sampling. Obtain these measurements whether or not well logs are available, since the measurements are required in calculating the static water volume of the well.

7. Measure the pH, temperature, and specific conductivity of the groundwater being sampled. To avoid possible contamination problems, measure temperature, pH, and specific conductivity on a portion of groundwater which is not in a sample container to be sent out for analysis.

SURFACE WATER SAMPLING PROCEDURES

Surface water sampling locations will be selected according to the probability that they will show contaminants migrating from a site. In general, samples will be taken from streams running through or adjacent to a site, including those bodies of water which may receive surface runoff or leachate from a site. Samples will only be collected where it can be shown that the site provides the only source of contaminants to the surface water body. Care will be taken in sampling leachate breakouts, which may have high concentrations of contaminants. Surface water will also be sampled from any adjacent standing bodies of water such as ponds, lakes, or swamps which might be receiving contaminants.

Grab samples will be collected using a pond sampler. The pond sampler, described in "Samplers and Sampling Procedures for Hazardous Waste Streams," EPA 1980 (EPA-600/2-80-018), consists of a beaker attached with a clamp to a telescoping aluminum pole. This sampler allows a sample to be collected several feet from the bank or berm.

TAP WATER SAMPLING PROCEDURES

Well depth, casing size, and holding-tank volume will be obtained if possible to calculate the volume of the system, and the system will be evacuated by removing three to five volumes by letting a tap run. If the well depth, casing size, or holding-tank volume is not readily available or is unknown, a tap will be opened and allowed to run for 15 minutes. The well evacuation strategy will be documented in the field book.

Samples will be collected in containers in accordance with the sampling guidelines from a point as close to the well as possible and before the water is processed through any water treatment devices (e.g., softeners or filters). In many cases this may not be possible. When samples must be collected after the filtration or softener system, the situation will be documented in the logbook. The exact type of filtration system or softener in use will be recorded. To determine whether desorption of the filters is occurring, samples may be collected after water has passed through treatment devices. When possible, do not collect samples through a water hose. Samples should be collected directly from the spout.

If samples are taken from direct water main connections, the spigot will be flushed for 2 to 3 minutes (15 to 30 minutes is not necessary) to clear the service line. Water parameters (temperature, conductivity, pH) will be measured. Well purging will be considered complete after three (3) consistent readings of pH, temperature, and conductivity. Samples will *not* be collected from spigots after treatment (except as noted above) or from spigots that leak around their stems or that contain aeration devices or screens within the faucet.

For private wells equipped with hand or mechanical pumps, the water will be pumped for 5 minutes before the sample is collected directly from the spout.

SURFACE SOIL SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the soils with the minimum of samples. A surface inspection of the subject area will be made to locate pertinent features (e.g., rock outcrops, drainage patterns, surface runoff, erosion areas, etc.) and to evaluate the relationship among these features and potential sources of pollution. The locations of sediment deposition areas are good indicators of surface runoff direction.

A method of obtaining a shallow soil sample is to use stainless steel spoon or shovel. The soil sample will then be placed in the appropriate glass bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs. If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to minimize headspace. A decontaminated shovel or spade can be used to uncover the top 6 inches of soil so the sample can be collected from beneath the surface.

Sampling equipment such as stainless steel scoops and spoons, and shovels or spades must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used. If dedicated equipment are not used, then an equipment rinsate sample shall be collected at the end of each sampling day to demonstrate decontamination efficiency by TNRCC field personnel.

SEDIMENT SAMPLING PROCEDURES

Areas selected for sampling will be located in order to collect a representative fraction of the sediments with the minimum of samples. The primary consideration in sample site selection will be to choose an area of quiescent settling with low hydrologic activity or energy, and to evaluate these areas and potential sources of pollution. For example, areas that are: 1) inside the bend of channels; 2) backwater areas or side channels; and 3) of heavy shoaling and deposition. Quiescent areas are conducive to the settling of finer materials.

Sediment samples will be collected by use of a stainless steel spoon or an Ekman dredge for samples greater than six (6) inches beneath the water surface. When using a dredge, it will be lowered to the bottom of the water body with a minimum of substrate disturbance. Once the dredge jaws have been triggered, the closed dredge will be retrieved at a moderate speed of less than two (2) feet/second. Water overlying the sediment in the dredge will be gently decanted by slightly tipping the dredge until the water runs out the top. The decanting process will be completed in a manner to avoid the removal of surficial sediments. In order to avoid contamination from material on the dredge walls, a stainless steel spoon will be used to remove sediments to a depth of one inch and no closer than 0.75 inches to the wall of the dredge. The sediment sample will then be placed in the appropriate glass bottle. Rocks and branches will not be transferee to the sample bottle. Additional dredge samples will be collected as needed to fill the sample bottle. After the sample has been collected, the top of the bottle and lid will be wiped with a clean paper towel to ensure a tight seal. Samples for VOA analysis will be collected first, followed by samples for BNA's, metals and pesticides/PCBs.

If metals are the primary concern at a site, the metals sample will be collected second. Care will be taken to fill the 120 mL VOA sample as full as possible to minimize headspace. The Ekman dredge and stainless steel spoons must be decontaminated according to the specified procedures between sampling locations to avoid cross contamination. Dedicated sampling equipment will normally be used.

DECONTAMINATION PROCEDURES

To prevent contamination of samples by materials originating from the variety of on-site sampling tools and equipment, all sampling equipment (sample scoops, bailers, surface water dippers) will be decontaminated. Dedicated sampling equipment will be available for each sample planned. All equipment to be used at one site will be decontaminated in one batch prior to initiating any sampling. Each sampling tool will be placed in an individual sealable plastic bag or wrapped in a large plastic trash bag and closed with a custody seal. In the event that additional sampling is required or a sampling tool's integrity is questionable, then that tool will go through a decontamination process. The decontamination procedures are as follows:

1. Rinse equipment with tap (potable) water.
2. Clean the equipment with a brush in a solution of laboratory-grade detergent (Liquinox, Alconox, or equivalent) and potable water.
3. Rinse with tap water.
4. Rinse with 10 percent nitric acid solution, (trace metals grade) if analyzing for metals.
5. Rinse with distilled or deionized water.
6. If analyzing for organics, rinse with reagent-grade isopropanol.
7. Rinse with deionized water.

8. Air dry.

9. Place in plastic sealable bag if immediate use is not expected.

The sampling equipment will be cleaned as described above before its use for collecting each sample. After sampling is complete, each sample tool will be cleaned with a detergent wash and rinsed with distilled water to remove any potential contamination.

(B3) SAMPLE HANDLING/CUSTODY REQUIREMENTS

Sample custody is an integral part of any sample collection and analysis plan. Several steps for maintaining sample custody apply to field sample custody versus laboratory sample custody. First, in the field, the appropriate collection, identification, preservation, and shipment of the samples will ensure sample integrity. The second step is correct sample bottle identification and preparation. Lastly, when samples reach the laboratory, they are assigned a laboratory number and maintained at 4°C until sample preparation and analyses can be performed.

FIELD SAMPLE CUSTODY

Sample custody and documentation procedures described in this Section will be followed throughout all sample collection for all TNRCC SSIs. Components of sample custody are field logbooks, sample labels, sample tags, and chain-of-custody forms. CLP Organic and Inorganic Traffic Report (TR) forms will serve as chain-of-custody forms for this project. When Dioxin samples are to be collected the PCDD/PCDF Traffic Report (For Dioxin CLP Analysis) form will be used for this project.

FIELD LOGBOOKS

Bound field logbooks will be maintained by the Site Investigation Manager and other team members to provide a daily record of significant events, observations, and measurements during the field investigation. Each page in the logbook will be initialed by the author and signed after the last entry of each day. All entries by persons other than the author will be initialed or signed. All entries will be signed and dated.

All information pertinent to the field survey and sampling will be recorded in the logbooks. The logbooks will be bound books with consecutively numbered pages that are at least 4 1/2 inches by 7 inches in size. Waterproof ink will be used in making all entries. Entries in the logbook will include, at the minimum, the following:

- General information:

- Names and titles of author and assistant, date and time of entry, and physical/environmental conditions during field activity
- Location of sampling activity
- Name and title of field crew.

- Sampling documentation:

- Sample medium (e.g., soil)
- Description of sampling point(s)
- Date and time of collection
- Sample identification number(s).
- Photographs

- Other information:

- Names and titles of any site visitors or interviewees
- Field observations and unusual field conditions
- Any field measurements made (such as pH, conductivity, temperature) including specific calibration data and documentation of field equipment (serial number, decontamination, etc.)
- Modifications to the work plan
- Sample handling (e.g., preservation with ice).

None of the field logbooks or chain-of-custody documents will be destroyed or discarded, even if they are illegible or contain inaccuracies that require a replacement document. If a previously recorded value is discovered to be incorrect, the wrong information will be crossed out in such manner that it is still legible, the correct value written in, and the change initialed and dated. If the change is made by someone other than the original author or if the change is made on a subsequent day, a reason for the change will be recorded at the then-current active location in the logbook, with cross-references.

SAMPLE TAGS

All samples collected at the site will be placed in an appropriate sample container for preservation and shipment to the designated laboratory. Each sample will be identified with a separate identification label and tag. The bottles and ice chests will be sealed with custody seals. Sample identification tags and custody seals will be provided by the CLP Sample Management Office. The tag will indicate if the sample is a split sample. The label will contain the sample number. The following information will be recorded on the tag:

- Analyses to be performed
- Sample identification number
- Source/location of sample
- Type of sample (composite or grab)
- Preservatives used (ice)
- Date
- Time (a four-digit number indicating the 24-hr clock time collection; for example, 1430 for 2:30PM)
- Sampler's signature
- CLP case number.

Once the tag is complete, a custody seal will be placed over the lid of the bottle. The custody seal will show the date and sampler's signature.

TRAFFIC REPORT FORMS

Introduction - Samples and Sample Numbers

The CLP organic and inorganic multi-sample Traffic Reports/Chain-of-Custody forms (TRs) document samples shipped to CLP laboratories. They also enable the Sample Management Office (SMO) and the Region to track samples and ensure that the samples are shipped to the appropriate contract laboratory. TRs will be used each time Routine Analytical Services (RAS) samples are shipped to a CLP laboratory. The TRs may document up to ten samples shipped to one CLP laboratory under one case number and RAS analytical program.

The TR includes a chain-of-custody record which is located at the bottom of the form. The form is used as physical evidence of sample custody. According to EPA enforcement requirements, official custody of samples must be maintained and documented from the time of collection until the time the samples are introduced as evidence in the event of litigation. The lead Site Investigation Manager is responsible for the care and custody of the sample until sample shipment.

A sample is considered to be in custody if any of the following criteria are met:

1. The sample is in possession of the sampling team or is in view after being in possession.

2. The sample was in possession and then locked up or sealed to prevent tampering.

3. The sample is in a secured area, and security is documented.

CLP sample types are defined by the RAS analytical program. Under the RAS Protocol (SOW), a RAS sample consists of a low or medium concentration water matrix or a soil/sediment matrix that is single phase and homogeneous. No oily sample, nor a multi-phasic sample can be shipped to a CLP laboratory operating under the RAS contract. Such high concentration samples are handled only by Special Analytical Services (SAS) CLP laboratories. The collection and management of high concentration samples will be conducted in accordance with the requirements outlined in the "Region 6 CLP Training Manual", October, 1991. PCDD/PCDF Traffic Report forms (For Dioxin CLP Analysis), SAS, and Multi-Client SAS Analyses will only be used in this project with approval of the Program Manager and EPA Site Assessment Manger.

Low concentration samples are samples collected from off-site areas, where hazards are thought to be significantly reduced by normal environmental processes. Medium concentration samples are those where a compound or element may comprise as much as 15% of the total sample.

Low/medium concentration inorganic, low to medium concentration organic, and high concentration organic. Low/medium inorganic samples may be analyzed for total metals, cyanide, or both. Low/medium organic samples may be analyzed for VOAs, base/neutral/acid (BNAs), pesticide/PCBs, or any combination of these. High concentration organic samples may be analyzed for VOAs, BNA/pesticide/PCBs, and aroclors/toxaphenes. Inorganic samples are documented on Inorganic TRs. Organic and high concentration samples are documented on Organic TRs.

A CLP sample is one matrix - water or soil - never both. The CLP sample is further defined as consisting of all the sample aliquots from one station location, for each matrix and RAS analytical program.

The CLP generates unique sample numbers that must be assigned to each organic and inorganic sample. The unique CLP sample numbers are printed at SMO on adhesive labels and distributed to the region as requested. The field team leader will be responsible for assigning this critical sample number correctly and transcribing it accurately on the TR.

Organic sample numbers are in the format XX123, and have ten labels per strip four for extractables, two for VOAs, and four blank (extra). **UNUSED LABELS will be destroyed to prevent duplication of sample numbers.**

Inorganic sample numbers are in the format MXX123 and have seven labels per strip-- two for total metals, two for cyanide, and three extra (see Attachment 1). Remember that the unique sample number must only be used once. **EXTRA LABELS must be destroyed.**

Use only the labels provided by EPA Region 6. CLP sample numbers are alphabetically coded to correspond with each region as follows:

Letter Code			Letter Code		
Organic	Inorganic	Region	Organic	Inorganic	Region
A	MA	I	F	MF	VI
B	MB	II	G	MG	VII
C	MC	III	H	MH	VIII
D	MD	IV	Y	MY	IX
E	ME	V	J	MJ	X

Remember:

- TRs must be used for each case number with every shipment of samples to each CLP laboratory.
- Organic samples, high concentration samples, and inorganic samples are assigned separate, unique sample numbers. Each sample consists of all the sample aliquots from a sample station location for analysis in one of the three analytical programs.
- A CLP RAS sample will be analyzed as either a water or a soil sample.
- Prevent accidental duplication of sample numbers by destroying unused labels.
- Use the sample numbers specific to EPA Region 6.

- Contact the Program Manager or Technical Director at telephone number 512/908-2514 or 512/908-2512 if you need to collect more than the previously approved number of samples or a high concentration sample.

- Call Regional Sample Control Center (RSCC) at telephone number 713/983-2130 or 713/983-2137 if you have any questions about using TRs.

Forms Completion - Case Documentation

Instructions for filling out the Organic and Inorganic Traffic Report/Chain of Custody forms are as follows:

Top of Form
- SAS Number

    - Enter this number only if explicitly told to do so by the RSCC.

    - Case Number

    - Enter this number.

Box No. 1

- Project code/site information:

    - Leave the Project Code, Account Code, Regional Information and Non-Superfund Program fields blank.

    - Enter the Site name, City/State and Site Spill ID in the designated spaces.

Box No. 2

- Regional information:

    - Enter the EPA Region number (6), the name of your Sampling Company (TNRCC), and your name and signature in the designated spaces.

Box No. 3

- Type of activity:

  - Check funding level for sampling. Next, check the code which describes the task of the sampling mission:

Funding Level

SF - **Superfund**
PRP - Potential responsible party
ST - State
FED - Federal

Pre-Remedial

PA - Preliminary Assessment
SSI - **Screening Site Investigation**
LSI - Listing Site Investigation

Remedial

RIFS - Remedial investigation feasibility study
RD - Remedial design
O&M - Operations and maintenance
NPLD - National priorities list delete

Removal

CLEM - Classic emergency
REMA - Removal assessment
REM - Removal
Oil - Oil response
UST - Underground storage tank response

Box No. 4

- Shipping Information:

  - Enter the Date Shipped, the Carrier (i.e. Federal Express, Purolator, Airborne) and the Airbill Number in the appropriate spaces.

Box No. 5

- Ship to:

  - Enter the name of the CLP laboratory contact (sample custodian) and its full address in the box.

Box No. 6

- Preservative:

  - This box provides a list of commonly-used preservatives. Please enter the appropriate preservative used in Column D.

Box No. 7

- Sample description:

  - This box provides a list of the description/matrices of samples that are collected. Please enter the appropriate description in Column A.

Completing the Form - Sample Documentation

  - Carefully transcribe the CLP Sample Number(s) from the printed sample labels on the TR in the space provided.

Note: If you have made a mistake, do NOT attempt to erase or write over your mistake. Draw a single line through the mistake and initial and date it. Then, enter the correct information on the next line.

Complete columns A through G to describe the sample.

Column A, Sample Description

Enter the appropriate sample description code from Box No. 7.

When out in the field:

If sampling groundwater or surface water, describe both VOA TRIP BLANKS and EQUIPMENT RINSATE SAMPLES as No. 1 "Surface Water."

If sampling only soil/sediment, describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

When conducting a laboratory decontamination event:

Describe both the EQUIPMENT RINSATE SAMPLE and the ULTRA DI SAMPLE as No. 4 "Field QC".

Note: Item No. 6 "Oil" and item No. 7 "Waste" are for SAS projects only. DO NOT SHIP OILY SAMPLES OR WASTE SAMPLES WITHOUT MAKING PRIOR ARRANGEMENTS WITH THE PROJECT MANAGER AND RSCC.

Column B, Concentration

Organic--If sample is estimated to be low or medium concentration, enter "L." When shipping SAS high concentration samples (previously arranged with Program Manager and RSCC), enter"H."

Inorganic--Enter "L" for low concentration, "M" for medium concentration, and "H" for high concentration (under previous SAS arrangement).

Note: Ship medium and high concentration organic and inorganic samples in metal cans.

Column C, Sample Type

Please enter which type of sample (composite or grab) was collected.

Column D, Preservation

Please enter preservation used (i.e., HCL, NaOH, HNO_3, H_2SO_4) refer to Box No. 6 or the reference number of the preservation (1-7, N). Always include ice as a preservative in addition to any chemical preservative used.

Column E, RAS Analysis

Check the analytical fractions requested for each sample, for example, VOAs, SVs, and pesticides are for low/medium concentration organics. Request only total metals and cyanide for RAS low/medium concentration inorganics.

Note: Aroclors/Toxaphenes may be requested, when using the High Concentration SOW, in a SAS Request.

Note: Either total or dissolved metals can be requested for each individual inorganic sample assigned a unique sample number, but not both analyses. A unique number must be assigned for each, even though they are from the same station location.

Column F, Regional Specific Tracking Number or Tag Number

Enter the Region specific tracking number or tag number(s) in the space provided. Since space is limited try to use tag numbers in a sequential order.

Column G, Station Location Number

Enter the Station Location Number in the space provided.

Column H, Month/Day/Year/Time of Sample Collection

Record the month, day, year, and time in military time (e.g., 1600 hours = 4:00 P.M.) of sample collection.

Column I, Sampler Initials

Enter the samplers initials.

Column J, Corresponding CLP Organic/Inorganic- Sample No.

Enter the corresponding CLP sample number for organic or inorganic analysis.

Column K, Designated Field QC

Enter the appropriate qualifier for "Blind" Field QC samples in this column.

Note: All samples must have a qualifier.

Blind Field QC	Qualifier
Blank	B
Duplicate	D
Rinsate	R
Performance Evaluation Samples	PE
Not a QC sample	———

Note: **This information will be entered into EPA Headquarters database to track QC sample data. Please complete this Section carefully and accurately.**

Box Titled, "Shipment for Case Complete (Y/N)"

This should reflect the status of the samples scheduled at a lab for a specific case. When ALL samples scheduled/collected for shipment to a lab for a specific case have been shipped, the case is complete.

Box Titled, "Page 1 of "

Please enter the number of TRs per shipment.

Box Titled, "Sample Used for Spike and/or Duplicate"

Please enter sample number to be used for matrix spike and/or duplicate sample (internal lab QC). One per twenty/matrix/concentration/lab. See back of TR form.

Box Titled, "Additional Sampler Signatures"

Please record any additional sampler signatures you are unable to record in box 2.

Box Titled, "Chain-of-Custody Seal Number"

Leave the Chain-of-Custody Seal Number blank (Not used in Region 6).

Box Titled, "Split Samples Accepted/Declined"

Sampler should ask sight owner, PRP, etc. whether they want split samples taken. The split samples are either accepted or declined. Sampler should record their signature if split samples are collected and check the appropriate box.

How and When to Separate and Send Traffic Report/Chain-of-Custody Form Copies

When all paperwork has been completed by the sampler and samples are ready to be shipped:

Bottom 2 copies (white and yellow) of the traffic report/chain-of-custody forms should be placed in a plastic bag and taped to the inside of the cooler.

Top Blue/Green copy - Send to Region within five (5) working days from date of sample shipment. On this copy indiciate in Column K the duplicate sample number.

Myra Perez
USEPA Region 6
10625 Fallstone Road
Houston, Texas 77099

Pink copy - Send to Sample Management Office (SMO) on the same day as the samples are shipped.

Sample Management Office
300 North Lee Street
Suite 200
Alexandria, Virginia 22314

Instructions on the Reverse

Instructions summarizing CLP sample volumes, packaging, and shipment reporting requirements are printed on the back of the TRs.

SHIPPING OF SAMPLES

Samples will be shipped and delivered to the designated laboratory for analysis daily. During sampling and sample shipment, the lead Site Investigation Manager (or designee) will contact the SMO (designated on the CLP RAS Lab Assignment information facsimile) to inform them of shipments. **TNRCC WILL NOT CONTACT THE RECEIVING LABORATORY!!**

The samples will be shipped in ice chests by an overnight carrier such as Airborne Express. The TR forms (white and yellow) will be placed within the ice chest, which will be sealed with custody seals and/or tamper-resistant tape. Custody seals will be signed by the sample custodian shipping the samples. The air bill number will be noted on the chain-of-custody form. In addition the Airbill and TR form(s), each ice chest will contain an additional Airbill to provide for return of the ice chest to Judie Mattocks, Pollution Cleanup Division, TNRCC, Technical Park Center, Building D, 12118 North IH-35, Austin, Texas 78753.

(B4) ANALYTICAL PROCEDURES and (B10) DATA MANAGEMENT

All analytical procedures will conform to analytical methods specified in the Routine Analytical Services (RAS) contract with the EPA. All data is managed by EPA in accordance with the USEPA Contract Laboratory Program Statement of Works for Organic and Inorganic Analyses. Data received by TNRCC in accordance with the 1996 and 1997 Cooperative Agreement is returned to EPA after validation for use in the SSI reports. EPA maintains full control of record-keeping procedures, receipt of data from the laboratory, and for detecting/correcting laboratory errors.

As per the EPA-CLP Statement of Work for Organic Analysis (including February 1994 revision), laboratories are required to perform any method specified in Exhibit D for volatile organic compounds (CLP-VOA), semivolatile organic compounds (CLP-SV), and pesticide/PCB compounds (CLP-PEST).

As per the EPA-CLP Statement of Work for inorganic analysis (including February 1994 revision), laboratories are required to perform methods specified in Exhibit D. Metals will be analyzed using the 200 series, CLP-modified, methods as specified in Exhibit D. Cyanide will be analyzed by method 335.2 CLP-modified. Table 2.3 list the methods to be performed during this project under the RAS contract. If methods other than those included in RAS are required, then this QAPP will be amended accordingly.

Table 2.3 Analytical Procedures for USEPA-CLP

Parameters	Method
Organics	
Volatile organics (VOA)	CLP-VOA
Semivolatile organics (BNA)	CLP-SV
Pesticides/PCBs	CLP-PEST
Inorganics	
Cyanides	335.2 CLP-M*
Metals	
Aluminum	202.2 CLP-M or 202.1 CLP-M
Antimony	204.2 CLP-M
Arsenic	206.2 CLP-M
Barium	208.2 CLP-M or 202.1 CLP-M
Beryllium	210.2 CLP-M
Cadmium	213.2 CLP-M
Calcium	218.2 CLP-M
Chromium	215.1 CLP-M
Cobalt	219.2 CLP-M or 219.1 CLP-M
Copper	220.2 CLP-M or 220.1 CLP-M
Iron	236.2 CLP-M or 236.1 CLP-M
Lead	239.2 CLP-M
Magnesium	242.1 CLP-M
Manganese	243.2 CLP-M or 243.1 CLP-M
Mercury	245.1 CLP-M, 245.2 CLP-M, or 245.5 CLP-M
Nickel	249.2 CLP-M or 249.1 CLP-M
Potassium	258.1 CLP-M
Selenium	270.2 CLP-M
Silver	272.2 CLP-M
Sodium	273.1 CLP-M
Thallium	279.2 CLP-M
Vanadium	286.2 CLP-M or 286.1 CLP-M
Zinc	289.2 CLP-M or 289.1 CLP-M

* CLP-M modified for the Contract Laboratory Program

(B5) QUALITY CONTROL REQUIREMENTS

Quality assurance for analytical work on this project will involve analysis of blank samples, spiked samples, and duplicate samples. For each group of 20 samples (or less if fewer than 20 samples are collected) of similar matrix (i.e., groundwater, soil or sediment) collected at each site, CLP internal laboratory QA/QC analysis will be conducted on one blank, one spiked, and one duplicate spiked sample. Field duplicates will be collected at a rate of 10% for each matrix and/or one per day, whichever is greater. Also, the TNRCC will include in each ice chest with samples to be shipped for analysis a temperature blank taped to the side of the chest prior to shipping.

LABORATORY QUALITY CONTROL BLANKS, SPIKED BLANKS, AND MATRIX SPIKES

Analysis of blank samples verifies that the analytical method does not introduce contaminants. The spiked blank is generated by addition of standard solutions to the blank water. The matrix spike will be generated by the CLP laboratory through the addition of standard solutions to a randomly selected field sample. Extra volume (triple volume) for a matrix spike and matrix spike duplicate will be collected for one water sample (groundwater or surface water, but not both) by the field team and sent to the assigned CLP Laboratory for internal quality control. In addition, one soil sample (no extra volume) will be designated on the TR by the field team and sent to the designated CLP laboratory for internal quality control per day of sampling.

FIELD BLANKS

Volatile organics samples are susceptible to contamination by diffusion of organic contaminants through the Teflon-lined septum of the sample vial; therefore, a VOA field blank will be analyzed to monitor for possible sample contamination. The field blank also serves to detect contaminants in the sample bottles. Each field blank will be prepared by filling two VOA vials with CLP-specified grade water and shipping the blanks with the sample bottles. Field blanks accompany the sample bottles through collection and shipment to the laboratory and are stored with the samples. The field blanks will be analyzed for VOAs. Results of field blank analyses will be maintained with the corresponding sample analytical data in the project file.

One field blank will accompany each ice chest containing samples collected for VOA analyses. Samples for VOA analysis will be shipped together as practicable.

FIELD DUPLICATES

For samples collected for laboratory analysis, field duplicates will be collected at a rate of 10 percent of the total number of samples collected during each day of sampling for each sample matrix type at every site. The number of samples collected will be rounded up to the next increment of ten, such that twenty-one samples would require collection of three duplicates, if collected within three days. At least one field duplicate will be collected per day of sampling and will be packaged and sent to the laboratory for analysis with the other samples of the same sample matrix type.

EQUIPMENT RINSATE SAMPLES

Equipment rinsate samples will be collected to establish that proper sample bottle preparation, decontamination and handling techniques have been employed. The equipment rinsate sample will be collected at the TNRCC Region 11 Austin Office laboratory prior to the sampling activities. Dedicated sample equipment will be used at each site for each sample station. All sample equipment will be decontaminated in the field and carefully packaged for return to the TNRCC Central Office. The decontaminated equipment will be taken to the TNRCC Region 11 Austin Office laboratory where one equipment blank will be collected and shipped to the assigned CLP laboratory for analysis. The equipment rinsate sample will be prepared by collecting CLP-specified grade water from the final rinse of the sampling equipment. Finally, the sample equipment will be placed in individual dated plastic bags, including chain-of-custody seals.

If sample equipment must be used more than once in the field, then the decontamination procedures for sample equipment will be followed and a rinsate sample collected in the field at the end of each sampling day and/or between each sample matrix type sampled, whichever is greater, and shipped to the assigned CLP laboratory with the associated sample matrix type. The number and type of QA samples at each site will be estimated in the SSI work plan. Modifications to the plan may be deemed necessary by the site investigation manager depending on field conditions, the on-site determination of additions or removals of sample locations, and the number of days required to complete the site sampling investigation.

(B7) CALIBRATION PROCEDURES AND FREQUENCY

Calibration of field instruments and equipment will be performed at approved intervals as specified by the manufacturer or more frequently as conditions dictate. Calibrations also may be performed at the start and completion of each test run. However, such calibrations will be re-initiated after any delay caused by meals, work shift change, or damage incurred. Calibration standards used as reference standards will be traceable to the NIST, when existent. Standards will be used and duplicate samples analyzed in the field to verify pH and specific conductance data.

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the EPA-CLP specifications. Calibration of laboratory equipment will be based on approved written procedures. It is the responsibility of the EPA data validators to ensure that the proper calibration protocols specified in the CLP statement of work were used. These calibration procedures and frequencies are included in the EPA Contract Laboratory Program, "Statement of Work for Organic Analysis" (Exhibit E) including revisions through August 1991, and in the EPA Contract Laboratory Program, "Statement of Work for Inorganic Analysis" (Exhibit E) including revisions through September 1991.

Records of calibration, repair, or replacement will be filed and maintained by the designated laboratory personnel performing quality control activities in accordance with EPA-CLP requirements. Calibration records of assigned laboratories will be filed and maintained at the laboratory location where the work is performed and will be subject to QA audit.

(B6 and B8) INSTRUMENT/EQUIPMENT TESTING, INSPECTION, PREVENTIVE MAINTENANCE PROCEDURES

Equipment, instruments, tools, gauges, and other items requiring preventive maintenance will be serviced in accordance with the manufacturer's specified recommendations and written procedures developed by the operators.

SCHEDULES

Manufacturer's procedures identify the schedule for servicing critical items in order to minimize the downtime of the measurement system. It will be the responsibility of the operator to adhere to this maintenance schedule and to arrange any necessary and prompt service as required. Service to the equipment, instruments, tools and gauges shall be performed by qualified personnel.

In the absence of any manufacturer's recommended maintenance criteria, a maintenance procedure will be developed by the operator based on experience and previous use of the equipment.

RECORDS

Logs will be established to record maintenance and service procedures and schedules. All maintenance records will be documented and traceable to the specific equipment, instruments, tools, and gauges. Records produced will be reviewed, maintained, and filed by the operator when equipment, instruments, tools, and gauges are used at the sites. The Program QA/QC Officer will audit these records to verify complete adherence to these procedures.

SECTION 3

ASSESSMENT/OVERSIGHT

(C1) ASSESSMENT AND RESPONSE

QA audits are performed by the Program QA/QC Officer. Functioning as an independent agent, the Program QA/QC Officer will plan, schedule, and approve system and process audits according to company procedure, customized to specific project requirements. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, activities, and documentation of the measurement system(s), including subcontractor activities.

The Program QA/QC Officer will report directly to the Technical Director. The Program QA/QC Officer will coordinate and monitor the overall QA program, including all on-site activities and the quality control programs of the laboratories. Implementing prompt, effective, and accurate corrective action in response to noncompliance that may occur on projects is absolutely essential in assuring the quality of the end product.

QUALITY SYSTEM AUDIT

A quality system audit refers to a detailed evaluation of the Project's Quality Assurance Program to determine its conformance to the Multi-Site Cooperative Agreement commitments and standard TNRCC procedures. Such an audit includes preparation of formal plans and a checklist based on established requirements. A copy of a field audit checklist is at the end of this section. Audits may be performed on TNRCC and subcontractor work.

(C2) REPORTS TO MANAGEMENT

Audit reports will be written by the Program QA/QC Officer after gathering and evaluating all available data. Items, activities, and documents determined by the Program QA/QC Officer to be non-compliant will be identified at interviews conducted with the involved management. Non-compliant elements will be logged, documented, and controlled through audit findings, which are attached to the audit report. These audit findings are directed to the Program Manager to resolve the noncompliance satisfactorily in a specified and timely manner.

All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the Program QA/QC Officer prior to issue. QA verification of acceptable resolutions may be determined by re-audit for documented surveillance of the item or activity. Upon verification acceptance, the Program QA/QC Officer will close out the audit report and findings.

It is the Program Manager's overall responsibility to ensure that all corrective actions to resolve audit findings are acted upon promptly and satisfactorily by project personnel.

FIELD AUDIT CHECKLIST

Project No. ________

Project Name ____________________________

Site Investigation Manager __________________________

Auditor ___________________________

Dates of Field Audit _/__/__ - _/__/__

1. The Site-Specific Health and Safety Plan has been prepared by the TNRCC Site Investigation Manager and subsequently approved by the TNRCC Program Manager and TNRCC Health and Safety Officer prior to arrival to the site.

Yes ___ No ___

Comments____

____

2. The Site-Specific Health and Safety Plan has been signed by all who intend to enter within the site boundaries prior to entry onto the site.

Passed ___ Failed ___

Comments____

____

o Project organization:

1. Did the Site Investigation Manager hold a briefing with each participant to go over any concerns or questions for project organization; and

2. Did the Site Investigation Manager provide appropriate number and types of material supplies necessary to collect samples (jars, bottles, gloves, pens, coolers, coolant, preservatives, protective gear, Work Plan, Health and Safety Plan, CLP, QAPP or other reference material)?

Adequate ___ Marginal ___ Failed ___

Comments____

____

3. Were additional instructions given to each participant not otherwise found in the preliminary written material, such as the Site-Specific Work Plan, Health and Safety Plan, CLP or QAPP?

Not Applicable ___

Additional Instructions_________________________________

____

o Samples collection procedures:

1a. The Site Investigation Manager ensured that the sampler collected adequate volumes of sample to allow for the planned sample analyses and field duplicates, plus any laboratory QC blanks and laboratory QC duplicates/spikes, as applicable; and

1b. The Site Investigation Manager provided a supply of the appropriate type of sample containers for the samples collected.

No Modifications ___ Modifications ___ Failed ___

Comments____

____

2. Were samples collected as stated in the Site-Specific Work Plan (number, frequency, and type)?

No Modifications ___ Modifications ___

Sample Modifications____

____

○ Chain of Custody:

1a. The Site Investigation Manager ensured that the sample tags were properly completed and attached to each sample container;

1b. The Site Investigation Manager ensured that the custody seals were properly completed and attached to each sample container in unbroken condition; and

1c. The Site Investigation Manager ensured that each sample container was labeled with the sample number and protected with clear tape.

Passed ___ Failed ___

Comments____

____

2. Each traffic report has been completed, faxed to EPA, original copy mailed to EPA, and copies corrected as necessary.

Passed ___ Failed ___

Comments____

____

3. The traffic report accompanied each shipment to the correct EPA contract lab.

Passed ___ Failed ___

Comments____

____

4. Field observations are written in ink and are presented accurately in the field logbook, and each page is signed and dated.

Passed ___ Failed ___

Comments____

____

5. Photographs are logged in the logbook with the date, time, location, name of person taking the picture, type of sample, sample number, and the photo number.

Yes ___ No ___

Comments____

____

6. Prior to use, the Site Investigation Manager ensured that the measuring equipment was calibrated to standard procedures as presented in accompanied documents written specifically for the instrument.

Passed ___ Failed ___

Comments____

____

7. Have any accountable documents been lost?

Not Applicable ___

Documents Lost____

____

General Comments or Concerns Regarding the Sampling Procedures, Organization, and Site Investigation Management:

____

____

____

Signature of Auditor ________________________

SECTION 4

DATA VALIDATION AND USABILITY

(D1 and D2) DATA REVIEW, VALIDATION, VERIFICATION METHODS

FIELD MEASUREMENT DATA

Field measurements will be made by field geologists and engineers, environmental analysts, and technicians. The following standard reporting units will be used during all phases of the project:

- pH will be reported to 0.1 standard units.
- Specific conductance will be reported to two significant figures below 100 umhos per centimeter (umhos/cm) and three significant figures above 100 umhos/cm.
- Temperature will be reported to the nearest 0.5° Celsius (°C).
- Water levels measured in wells will be reported to the nearest 0.01 foot.
- Soil sampling depths will be reported to the nearest 0.5 foot.

Field data will be validated using different procedures.

- Routine checks will be made during the processing of data - for example, looking for errors in identification codes.
- Checks may be made for consistency with parallel data sets (data sets obtained presumably from the same population) - for example, from the same region of the aquifer or volume of soil.

The purpose of these validation checks and tests is to identify outliers, i.e., observations that do not conform to the pattern established by other observations. Outliers may be the result of transcription error or instrumental breakdowns. Outliers may also be manifestations of a greater degree of spatial or temporal variability than expected.

If an outlier is identified, a decision concerning its fate will be rendered. Obvious mistakes in data will be corrected when possible, and the correct value will be inserted. If the correct value cannot be obtained, the data may be excluded. An attempt will be made to explain the existence of the outlier. If no plausible explanation can be found for the outlier, it may be excluded, but a note to that effect will be included in the report. Also, an attempt will be made to determine the effect of the outlier when both included and excluded in the data set.

LABORATORY DATA

The procedures used for calculations and data reduction are specified in each method referenced previously. It will be the responsibility of the laboratory to follow these procedures.

VALIDATION

The laboratory data will be validated by EPA according to the following EPA documents:

- National Functional Guidelines for Organic Data Review (February 1994)
- National Functional Guidelines for Evaluating Inorganics Analyses (February 1994).

REPORTING

The project analytical report from the CLP laboratory will contain data sheets and the results of analysis of QC samples. Analytical reports may also contain the following items:

- Project identification
- Field sample number
- Laboratory sample number
- Sample matrix description
- Date of sample collection
- Analytical method description and reference citation
- Individual parameter results
- Date of analysis (extraction, first run, and subsequent runs)
- Quantitation limits achieved
- Dilution or concentration factors
- Corresponding QC report (including duplicates and spikes).

Matrix interferences on some of the samples, particularly the waste samples, may result in increased detection limits. Matrix interference will be reported as the cause of increased detection limits. These data will be valid.

(D3) RECONCILIATION WITH DQO

The following procedures have been established to assure that conditions adverse to quality--malfunctions, deficiencies, deviations, and errors--are promptly investigated, evaluated, and corrected.

INITIATION OF CORRECTIVE ACTION

When a significant condition adverse to quality is noted at the project site, laboratory, or subcontractor locations, the cause of the condition will be determined and corrective action taken to preclude repetition. All project personnel have the responsibility, as part of normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality.

Corrective actions may be initiated at a minimum:

- When predetermined acceptance standards--objectives for precision, accuracy, and completeness--are not attained.
- When procedures or data compiled are determined to be faulty.
- When equipment or instrumentation is found faulty.
- When samples and test results cannot be traced with certainty.
- When quality assurance requirements have been violated.
- When designated approvals have been circumvented
- As a result of an audit.

PROCEDURE DESCRIPTION

Project management and staff, including field investigation teams, sample control personnel, and laboratory groups, monitor ongoing work performance in the normal course of daily responsibilities.

Following identification of an adverse condition or quality assurance problem, notification of the deficiency will be made to the project manager and senior individual in charge of the activity found to be deficient, along with recommendations for correction.

Following implementation of corrective action, the senior individual in charge will report actions taken and results to the Program Manager and Program QA/QC Officer.

SECTION 5

EQUATIONS FOR PRECISION, ACCURACY, AND COMPLETENESS

Planned procedures used to assess data precision and accuracy are in accordance with 44 FR 69533, "Guidelines Establishing Test Procedures for the Analyses of Pollutants", and appendix III, "Example Quality Assurance and Quality Control Procedures for Organic Priority Pollutants", December 3, 1979. Completeness is recorded by comparing the number of parameters initially analyzed with the number of parameters successfully completed and validated.

PRECISION

Relative percent difference (RPD) is calculated as:

$$RPD = \frac{|x_1 - x_2|}{x} \times 100\%$$

where:
x_1 = analyte concentration of first duplicate
x_2 = analyte concentration of second duplicate
x = average analyte concentration of duplicates 1 and 2.

ACCURACY

Accuracy is expressed as a percent recovery (PR), calculated by:

$$PR = \frac{(A-B)}{C} \times 100\%$$

where:
A = spiked sample result (SSR)
B = sample result (SR)
C = spike added (SA).

COMPLETENESS

The completeness of the data will be determined by:

$$PC = \frac{N_a}{N_t} \times 100\%$$

where:
PC = percent complete
N_a = number of actual valid results
N_t = number of theoretical results obtainable.

APPENDIX D

Health and Safety Plan

APPENDIX F

References

HEALTH AND SAFETY PLAN
FOR
SCREENING SITE INSPECTION FIELD WORK
OLD BRAZOS FORGE SITE
TXD048901235

Prepared by

Texas Natural Resource Conservation Commission
Superfund Site Discovery and Assessment Team
Austin, Texas

Reviewed and approved by

Site Safety Officer:	Name	Date
Ray Newby Site Investigation: Manager	Name	3-20-96 Date
Allan M. Seils PA/SI Program Manager Representative:	Name	3/20/96 Date
C. Todd Counter TNRCC Central Office Health & Safety Representative:	Name	3/20/96 Date

MARCH 1996

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FIGURES

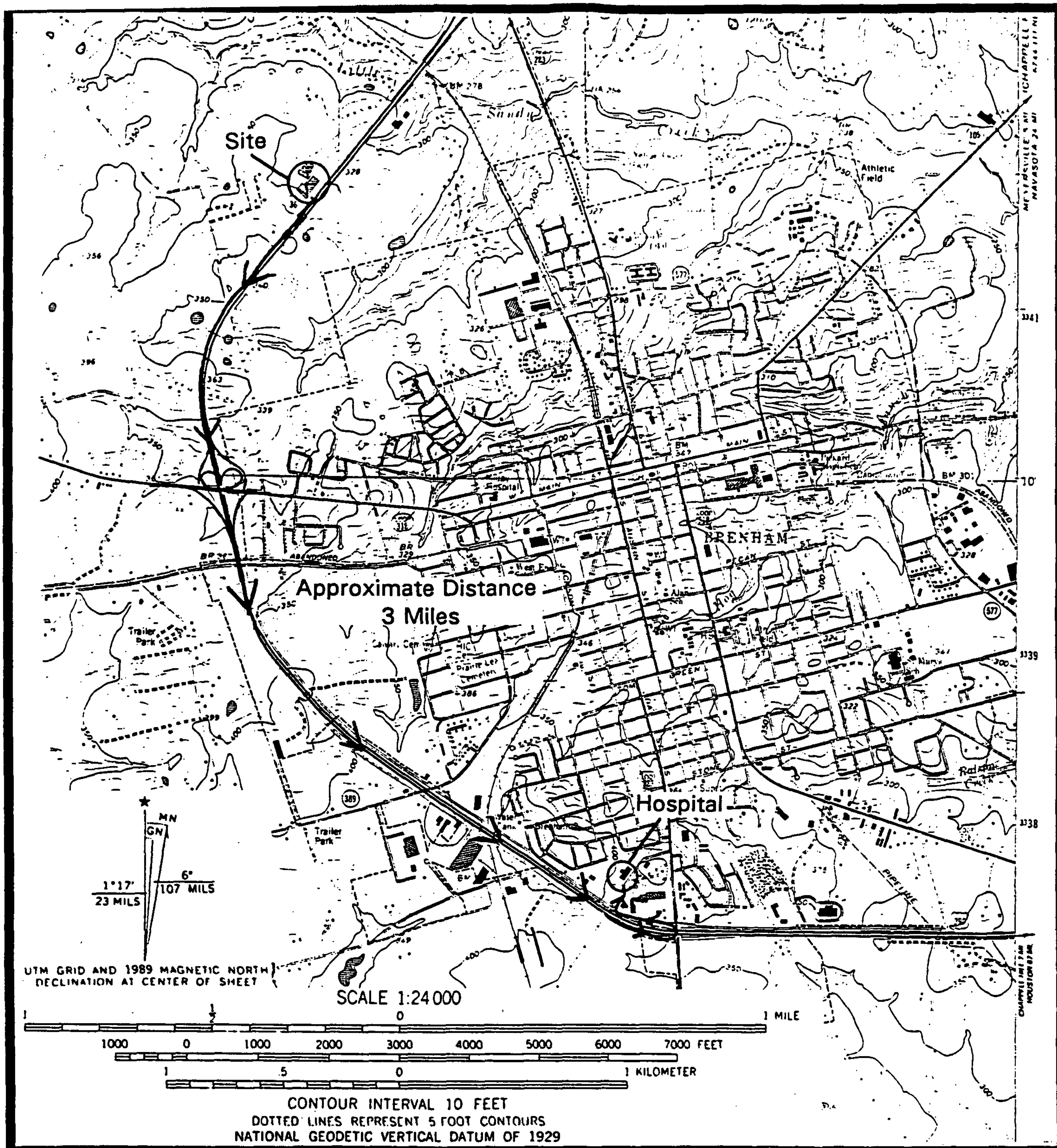
TABLES

EMERGENCY CONTACTS

In the event of any situation or unplanned occurrence requiring assistance, the appropriate contact(s) should be made from the list below. For emergency situations contact the appropriate response teams:

Contingency Contacts	Phone Number
Fire Department	**911**
Police	**911**
Sheriff's Department	**911 or (409) 277-6250**
Medical Emergency	**911 or (409) 830-2250**
Hospital Name	Trinity Medical Center Phone No. (409) 836-6173
Hospital Address	700 Medical Pkwy. Brenham, Texas
Map to Hospital (see next page)	

TNRCC Contacts	
TNRCC PA/SI Program Manager:	Allan M. Seils- Austin, Texas Phone: Work (512) 239-2514
TNRCC Central Office Health & Safety Representative:	C. Todd Counter- Austin, Texas Phone: Work (512) 239-2591
TNRCC Field Health & Safety Representative:	To be Determined Phone: Work



TNRCC

Figure I.1
Map to
Nearest
Hospital

Old Brazos Forge Site

Brenham (Washington County), Texas

CERCLIS No. TXD048901235

SECTION 1

INTRODUCTION

PURPOSE AND POLICY

The purpose of this health and safety plan is to establish personnel protection standards and mandatory safety practices and procedures for work conducted for screening site inspections (SSI) under the Texas Natural Resource Conservation Commission (TNRCC) Preliminary Assessment/Site Investigation (PA/SI) program. The plan assigns responsibilities, establishes standard operating procedures, and provides for contingencies that may arise while field work is being conducted at the Old Brazos Forge site in Washington County, Texas.

All personnel who engage in field project activities at the site must be familiar with this plan and comply with its requirements. The provisions of the plan are mandatory for all TNRCC field personnel on this project.

PROGRAM DESCRIPTION

This screening site inspection will be conducted in conformance with the requirements of the revised Hazard Ranking System (HRS) 40 CFR Part 300; Final Rule, dated December 14, 1990. TNRCC Central Office staff recently completed collecting information needed to prepare a work plan and this health and safety plan. TNRCC Central Office staff personnel may visit the site to assist in executing the work plan and/or conduct inspection activities. Activities that will be conducted during the site visit include: site reconnaissance, interviews with any site personnel, and collection of soil, sediment, and groundwater samples. The anticipated time frame for the execution of all the field work is March, 1996. This health and safety plan pertains to activities performed while executing the work plan.

SECTION 2

SITE INFORMATION

GENERAL INFORMATION

Site: Old Brazos Forge (OBF) site (EPA Identification number TXD048901235).

Location: 1709 Highway 36 North, northwest of Brenham, Washington County, Texas.

Mailing Address: None

Proposed date of field work: March, 1996

Hazard Assessment: ___ High _X_ Medium ___ Low

___ None ___ Unknown

Site description: The Old Brazos Forge (OBF) site (EPA Identification number TXD048901235). The facility was operated as a wire shelving manufacturing facililty by Hussman Corporation (Hussman) during the period from 1965 to 1988. The facility has been abandoned since 1994. The OBF site consists of approximately 20 acres located at 1709 Highway 36 North, northwest of Brenham, Washington County, Texas. The geographic coordinates of the site are approximately 29° 25' 07" north latitude and 30° 10' 56" west longitude. The remaining structures at the facility include a metal plant building covering approximately 110,000 ft^2 and located on the eastern side of the property with a concrete covered parking lot located between the building to the west and Highway 36 to the east. Three former settling lagoons with a combined area of approximately 2.4 acres are located in a separate fenced area northwest of the plant building. The site is currently inactive.

SCOPE OF WORK SUMMARY

The field team will collect groundwater, sediment, and soil samples. Sampling data to be collected includes: ten drinking water wells within a 1 mile radius of the site (and three duplicates), to be analyzed for organics and inorganics for the determination of downward and/or outward migration of contaminants from the site to nearby residential drinking water wells. Three additional drinking water wells within a 1.5 mile radius of the site will be designated as background wells. Extra volumes of water will be collected for laboratory QA/QC procedures. Well logs were available in the SSI workplan for the drinking water wells that are tentatively planned for sampling. These wells were identified during previous site investigations.

Three on-site ground water monitoring wells (and a duplicate) will be analyzed for organics and inorganics to determine whether downward and outward migration of contaminants from the site has impacted the uppermost aquifer. An additional monitoring well will be designated and sampled as a background well.

Three sediment background samples will be collected upstream of PPE 1 for attribution of contaminants to the site. One sediment sample and a duplicate will be collected at PPE-1. Another sediment sample will be collected approximately 200 feet downstream of PPE-1.

Three soil samples will be collected along the overland migration route. An additional soil sample will be collected as a duplicate. Three soil sampleswill be collected on-site for source characterization of contaminants to the facility. Two background soil sample will be collected for attribution of contaminants to the site. The background sample locations will be determined in the field. The likely locations will be southwest and upgradient of the site.

The soil and sediment sampling locations will be adjusted so that observed areas of contamination, as identified by potential soil contamination, visible soil staining, or visible leachate collection at the surface, are sampled.

These groundwater, sediment, and soil samples will be collected according to the procedures outlined in the QAPP (Appendix C).

No air samples are planned to assess releases to the air pathway; however, results of surface soil samples collected for soil exposure pathway will be used to assess potential for releases to occur to air pathway.

SITE/CHEMICAL CHARACTERISTICS

Chemical type(s):	_X_ Liquid	_X_ Solid	_X_ Sludge	___ Gas
Characteristic(s):	_X_ Corrosive	___ Ignitable	___ Radioactive	
	___ Volatile	_X_ Toxic	_X_ Reactive	
	_X_ Unknown	___ Other		

Summary of known wastes: See below.

List of chemicals used on site: The following inorganic analytes and compounds were

List of chemicals used on site: The following inorganic analytes and compounds were found on-site during previous TNRCC Region 12 and 5 inspections: lead, cyanide, cadmium, chromium, copper, nickle, and zinc.

Description of all known waste disposal areas on site: The following waste and/or containment areas of concern were identified at this facility during previous site investigations:

Surface Impoundments:

Three surface impoundments are located within an approximately two acre fenced area northwest of the facility plant building. These impoundments were used as heavy metal flocculation and settling lagoons for effluent discharged from the plant. The impoundments were certified as closed in 1984 after sludge and six inches of soil were removed from the lagoons and disposed.

Unnamed Tributary:

An unnamed tributary of Little Sandy Creek originates from west side of the subject property. This tributary is an intermittent stream/drainage canal which meanders to the north-northeast for a distance of approximately 3,000 feet to the junction with Little Sandy Creek. Field investigations conducted by TNRCC personnel revealed that the facility was discharging waste water from the lagoons to the intermittent stream without a permit.

Site waste management history: A review of the facility waste management activities records revealed that OBF had received, stored and processed metals and metal plating compounds for use in it's manufacturing and plating processes. Hazardous wastes associated with electroplating and rinsing have been identified at the site and are coded F006, F007, F009, and F014.

Summary of off-site disposal: Chemical analyses of soil samples collected from the unnamed tributary by TNRCC personnel in 1984, 1986, and 1987 revealed elevated levels of heavy metals downstream of the facility. Concentrations of chromium, nickel, zinc, and copper were detected at maximum concentrations of 58,000, 34,000, 3,000, 6,000 mg/Kg.

In 1992, 1993, and 1995, ground water samples were collected from area residential water wells located within one mile to the east of the site. Results of laboratory analyses of water samples from the water wells sampled indicated elevated concentrations of chromium as high as 0.056 mg/l in the drinking water aquifer beneath the area (Ref 5).

remaining structures are believed to be intact and accessible. A chain-link fence borders the facility. It is not known if the site has power or running water. There are reported to be three water wells located on-site. Information regarding the completion details of only one of the wells is known.

Current status of site: Inactive, closed surface impoundments are considered to be under post-closure care and maintenance.

Summary of the regulatory history of the site: In August 1980 OBF filed a Part A hazardous waste permit application with the Texas Department of Water Resources (TDWR) for the trench collection system and the surface impoundments. The surface impoundments were regulated as hazardous waste processing/disposal facilities under TDWR and Texas Water Commission (TWC) Solid Waste Registration No. 30897. OBF submitted registrations dated June 14, 1982 and June 13, 1989.

After a wastewater treatment system was installed in 1982, the facility ceased discharging into the surface impoundments and began discharging treated effluent under TWC Water Quality Permit No. 02542 and National Pollution Discharge Elimination System (NPDES) Permit No. TX 0089486, issued on April 5, 1982.

The wastewater conveyance trenches were closed in-place in accordance with a interim status closure plan approved by TDWR on April 26, 1982. The plan included the transfer of a portion of the hazardous material within the trenches, excavated prior to the construction of a concrete foundation, to one of the surface impoundments. TDWR approved the closure plan with the requirement that the trenches be regulated as a landfill as not all of the contaminated soil was removed.

The three surface impoundments were closed in-place with a closure plan approved by TDWR on October 19, 1983. Closure certification was provided for the surface impoundments on August 22, 1984.

In 1984, OBF recorded in the Washington County deed records a .459 acre area, identified as the conveyance trenches and a 1.964 acre area, identified as the surface impoundments as hazardous waste disposal sites.

In November 1984, the facility filed an Affidavit of Exclusion with TDWR. The affidavit was filed to exemplt OBF from submitting a RCRA Part B permit application. On July 31, 1985, the Texas Water Commission (TWC) withdrew the request for the RCRA Part B permit application, resulting in OBF being in violation of operating hazardous waste landfills without a permit. The landfills currently are not permitted.

A Notice of Violation was issued from the TWC Houston District on May 23, 1986 for notification, training, contingency plan, shipping, recordkeeping, and container for notification, training, contingency plan, shipping, recordkeeping, and container management.

On May 27, 1986, TWC requested a remedial action plan from Hussman to address the contaminantion at the OBF site.

TWC issued a Notice of Deficiency on May 27, 1988 to Hussman regarding a Groundwater Assessment Plan (GWA). On February 1, 1989, TWC requested Phase II monitor wells and samples, post-closure permit, and a workplan for off site investigation and remediation.

On August 2, 1989, TWC approved the Phase II Report with the stipulation that quarterly ground water monitoring continue.

Hussman notified TWC on June 24, 1992 that ownership of the property had transferred to Recycled Products Corporation (RPC) of Brenham, Texas. RPC sold the property to Reconversion Technologies of Texas, Inc approximately 2 months after purchasing the property from Hussman. No Notice of Registration update or notification by the facility owners was filed during 1992-1994.

On November 3, 1994, TNRCC issued a Notice of Executive Director's Preliminary Report and Petition for a TNRCC order assessing administrative penalties and requiring corrective action by Hussman Corp., Reconversion Technologies of Texas, and Recycled Products Corp.

SECTION 3

PROJECT TEAM ORGANIZATION

Table 3.1 describes the responsibilities of all staff and on-site personnel associated with this project. The names of individuals associated with this project are listed below:

TNRCC PA/SI Program Manager:	Allan M. Seils, Austin, Texas
Staff Safety Officer:	C. Todd Counter, Austin, Texas
Site Investigation Manager:	E. Ray Newby, Austin, Texas.
Assistant:	To Be Determined.
Site Safety Officer:	To Be Determined.

Personnel - The Site Investigation Manager designates the Site Health and Safety Officer who will be responsible to see that the site work is performed in a manner consistent with the Health and Safety Plan (HASP). The Site Health and Safety Officer will be responsible for Health and Safety briefings before each daily on-site inspection. **The Site Investigation Manager or the Site Health and Safety Officer may temporarily suspend field activities if health and safety of personnel are endangered. The Site Investigation Manager or the Site Health and Safety Offer may temporarily suspend an individual from the field activities for infractions of the HASP.**

Table 3.1
Staff and On-site Personnel

Title	General Description	Responsibilities
PA/SI Program Manager/ Deputy	Reports to upper-level management. Has authority to direct site investigation activities. Assumes responsibility of meeting all PA/SI program goals/objectives.	Prepares, organizes, and provides program support material. Reviews/approves the project Work Plan, Health and Safety Plan, and the Quality Assurance Project Plan. Appoints field team members for the field work. Briefs the Site Investigation Manager on his specific duties. Ensures, through the Staff Safety Officer, that safety and health requirements are met. Serves as the liaison with the Region VI EPA Representative.
Staff Safety Officer	Advises the PA/SI Program Manager on all aspects of health and safety. Reviews Health and Safety Plans submitted to Central Office.	Advises the PA/SI Program Manager on all health and safety issues. Reviews all project Health and Safety Plans to assure proper clothing and protective equipment are identified. Ensures that the proper protective clothing and safety equipment are available for the field investigation efforts.
Site Safety Officer	Advises the Site Investigation Manager on all aspects of health and safety. Assures proper field safety is implemented according to the project Health and Safety Plan.	Ensures that entry and exit controls at the site access control points are in place and maintained. Periodically inspects protective clothing and equipment. Confirms each team member's suitability for work based on a physician's recommendation. Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue. Implements the health and safety plan. Conducts periodic inspections to determine if the project Health and Safety Plan is being followed. Enforces the buddy system.

Table 3.1

Staff and On-site Personnel
(Continued)

Title	General Description	Responsibilities
Site Safety Officer (Continued)		Notifies, when necessary, local public emergency officials in coordination with on-site representatives. Coordinates emergency medical care. Ensures setup of decontamination lines and solutions appropriate for the type of chemical contamination on the site. Controls decontamination of all equipment, personnel, and samples from the contaminated areas. Ensures proper disposal of contaminated clothing and materials. Advises medical personnel of potential exposures and consequences. Notifies emergency response personnel by telephone or radio in the event of an emergency. Ensures that all personnel can appropriately use the equipment.
Site Investigation Manager	Prepares Work Plan, and Health and Safety Plan for review/approval. Responsible for field investigation phase of the project.	Obtains permission for site access from the property owners or their representatives. Coordinates all field activities with the appropriate local community officials. Prepares the Work Plan and Health and Safety Plan for Central Office review/approval. Ensures that the work plan is complete and submitted to meet schedule requirements. Executes the Work Plan, Health and Safety Plan, and assures QAPP requirements are met according to the project schedule. Enforces safety procedures through the Site Safety Officer. Documents field activities and sample collection efforts. Serves as a liaison with the on-site client representative.

Table 3.1
Staff and On-site Personnel

(Continued)

Title	General Description	Responsibilities
Site Investigation Manager (Continued)		Prepares and submits the final report and required support documentation for Central Office approval.
Field Team Members	Perform field activities as instructed by Site Investigation Manager.	Safely complete the on-site tasks required to fulfill the work plan. Notify Site Safety Officer or supervisor immediately of suspected or noted unsafe conditions observed in the field. Take precautions necessary to prevent injury to themselves and other employees. Read, sign-off, and comply with the project Health and Safety Plan before entering the site for field activities. Maintain visual contact between partners (buddy system). Perform only those tasks they believe they can do safely. Immediately report to the field team leader any accidents and/or unsafe conditions, or any deviations from the Health and Safety Plan.

SECTION 4

SAFETY AND HEALTH RISK ANALYSIS

RESPIRATORY HAZARDS

Respiratory hazards may exist on site from the potential presence of heavy metal contaminants, which could be inhaled if dust were produced during soil sampling activities.

CHEMICAL HAZARDS

Chemical hazards can exist when liquid, vapors, or soil samples contact human tissue. Every effort will be made to avoid inadvertent contact with the chemical media at the site. Since groundwater, soil, and sediment samples will be collected, protective equipment will be used to avoid physical contact. The chemical hazards at the site include: liquids, soils, and/or groundwater leachate containing hazardous substances and priority pollutant metals detected during previous investigations. Also, another potential hazard is contact with acidic soils or water, primarily through skin contact.

Information on the contaminants that may be encountered at the site is presented in Section 2 and Appendix B. The site may contain other hazardous chemicals that may release hazardous or toxic vapors. The site will be approached with caution, and any moving or handling of drums, containers, or equipment will be avoided.

Other chemical hazards which may be encountered at the site are airborne particulate from heavy metal contaminated soils. Since particulate are of concern, high winds and sampling activities which create dust and cause these particulates to become airborne, will impose a requirement to modify operating procedures. If these conditions occur at the site, work will be conducted upwind of the hazard. If the wind conditions change or a sampling activity results in particulate matter becoming a factor, the site will be evacuated, as necessary, to minimize unnecessary exposure, or appropriate safety protection equipment will be used.

ROUTES OF EXPOSURE

The field team may be exposed to contaminated materials through inhalation, ingestion, and/or skin and eye contact.

- Respiratory system contact with hazardous airborne materials can occur. If these conditions exist, field work will be conducted upwind, proper protective equipment will be used, or the site will be evacuated.

- Eye contact with solid samples that are contaminated can occur when a worker does not wear safety glasses while samples are being taken or handled.

- Skin contact with contaminated solid or liquid samples can occur when a worker does not wear gloves and protective clothing during sampling activities.

- Gastrointestinal system contact with samples can occur when workers do not observe personal hygiene rules designed to reduce the chance of ingesting site contaminants (i.e., wash hands before smoking, eating, or drinking).

PHYSICAL HAZARDS

Abandoned Sites

The site is currently abandoned. There may be unknown physical hazards encountered during site sampling events that could cause physical injury. The structural integrity of the buildings and structures, condition of the surface impoundment berms, and potential spill areas surrounding the known waste management units present unknown physical hazards. Field work should be performed using all normal safety precautions. The Health and Safety Plan guidelines concerning avoiding physical hazards will be followed, as a minimum. In addition,

- Unnecessary moving or opening any heavy or bulky containers, drums, bags, etc., will be avoided;

- The "buddy" system will be used at all times.

Heat Stress

If elevated temperatures are encountered, heat stress may occur. Field work may be performed when daytime temperatures are often high. Water will be available on site, and the Site Safety Officer will encourage workers to drink frequently to prevent dehydration and stay in shaded areas whenever possible. In addition, workers should adhere to the recommended work/rest schedule determined by the Site Safety Officer. Depending on work levels and outside temperatures, each individual should monitor his body temperature and note indications of heat stress as they onset. The "buddy" system will be used at all times to check each other for the first symptoms of heat stress.

Heat stress/stroke control. The TNRCC Site Safety Officer will set work and break schedules depending on the outside temperature. General guidelines for heat stress control while sampling include rest breaks in the shade for at least 10 minutes out of every hour during elevated temperatures. Rest time shall also include fluid replacement with water or electrolytes fluids.

Heat stress/stroke monitoring. The TNRCC Site Safety Officer will monitor workers who are performing strenuous activities in elevated temperatures for heat stress/ stroke. Monitoring will be conducted at the Site Safety Officers discretion, worker's request, or at the beginning of a rest period. The monitoring shall also be conducted when workers performance or mental status significantly changes. The heat stress monitoring plan may include:

- Measurement of worker heart rate, OR

- Measurement of body temperature, and

- Observation of the field team members for signs and symptoms of heat injury.

Heart rate (HR) will be measured by the radial pulse for 30 seconds as early as possible during the resting period. The HR at the beginning of the rest period should **not exceed 100 beats per minute.** If the HR exceeds 100 beats per minute, the next work period will be shortened by one third while the length of the rest period remains the same.

Body temperature will be measured using an oral thermometer. Worker **body temperature should not exceed 99.6°F.** If the worker's body temperature exceeds this, the work period will be shortened by one third while the length of the rest period remains the same. No person will be permitted to wear a semipermeable or impermeable garment **when body temperature exceeds 100.6°F.**

Table 4.1 presents suggested frequencies for heat monitoring. Heat stress monitoring will be performed by a person with a current first-aid certification. Workers that exhibit signs of heat injury will be allowed to rest until the signs are no longer observable. The signs of heat stress/stroke are depicted in Figures 4.1 and 4.2. Suggested emergency medical procedures for treating heat exhaustion and heat stroke are also provided.

Cold Injury

It is anticipated that the field sampling activities will occur during the winter months. All field personnel should be especially alert to the possibility of cold injuries, which are most likely to occur when an unprotected individual is exposed to cold temperatures. Temperature, humidity, precipitation, and wind all play roles in the development of cold injuries. The most serious cold injuries are hypothermia and frostbite. Dehydration can also occur if insufficient fluids are not taken as in hot weather. In cold weather, the individual may not be as aware of the problem since perspiration evaporates rapidly or is absorbed by layers of heavy clothing.

Individuals with a history of cold injuries (i.e., frostbite) have a higher-than-normal risk of recurrence, not necessarily involving the part previously injured. Individuals with prior cold injuries should notify the Health and Safety Officer and use the "buddy" system to monitor early detection of cold injury symptoms.

Table 4.1 - Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers[1]

Temperature	Normal Work Ensemble[2]	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 minute work period	After each 15 minutes work period
87.5-90°F (30.8-32.2°C)	After each 60 minutes work period	After each 30 minutes work period
82.5-87.5°F (28.1-30.8°C)	After each 90 minutes work period	After each 60 minutes work period
77.5-82.5°F (25.3-28.1°C)	After each 90 minutes work period	After each 90 minutes work period
72.5-77.5°F (22.5-25.3°C)	After each 150 minutes work period	After each 120 minutes work period

[1] For moderate work, e.g. walking about with moderate lifting and pushing.
[2] A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

53 # Heat Exhaustion/ Heat Cramps

Signs & Symptoms: cool, pale, clammy skin / fatigue and faintness/headache/ heavy sweating/ weak pulse/near-normal body temperature/nausea. Onset is gradual.

If person is unconscious, see *Heatstroke*, p. 54.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.

If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

→ Have the person lie down. Elevate legs and feet with pillows or rolled blankets.

→ Loosen or remove clothing. Cool the skin with cool, wet sponges or cloths applied to forehead, arms, and legs.

See illustration on opposite page

→ If the person has no heart problems or high blood pressure and is fully conscious, give sips of a salt solution (1 teaspoon salt to 16 oz. — 2 cups — water) every 15 minutes for about one hour. Check body temperature every 5 minutes and continue to cool with wet cloths.

→ If the person complains of muscle cramps, do not massage cramped muscles. This may increase pain.

→ Does temperature suddenly rise? Are there convulsions, stupor, or unconsciousness?

- Yes → If any of these occur, see *Heatstroke*, p. 54.
- No → Does the person begin to feel better after one hour?
  - Yes → Keep person out of the sun and as cool and comfortable as possible. → Person should be checked by a doctor as a precaution. Discourage unnecessary exercise; this person may now be more susceptible to heat. If symptoms reappear, repeat process and call a physician.
  - No → Seek medical care immediately. While awaiting assistance, continue cooling with wet cloths and checking body temperature frequently. → Smelling salts, held briefly under the nose, may help to stimulate the person. → If the temperature suddenly rises or convulsions, stupor, or unconsciousness develop, see *Heatstroke*, p. 54.

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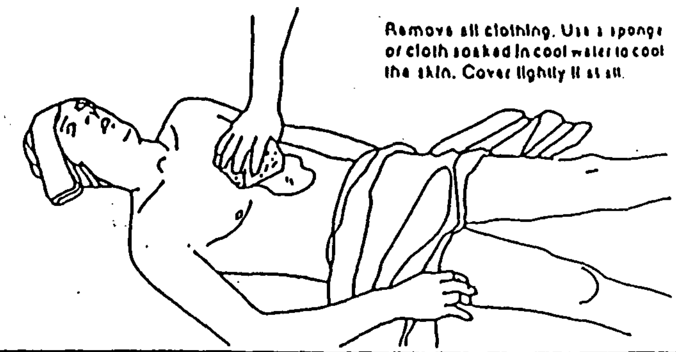


Remove all clothing. Use a sponge or cloth soaked in cool water to cool the skin. Cover lightly if at all.

Figure 4.1

Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

54 Heatstroke

Signs & Symptoms: *red, hot, dry skin/no perspiration/body temperature around 106°F (or very warm to the touch)/strong rapid pulse/stupor or unconsciousness*

If there are two or more rescuers, one should obtain emergency assistance while the other is following the procedures outlined below.

Calm the person by talking while attending to the problem. Explain what you are doing. Try not to show anxiety; act with confidence. Your calm behavior can help to reassure the sick person.

If possible, bring person indoors to a cool room. (Use air conditioner or electric fan or open windows and fan vigorously.) Outdoors, move person to a shaded area.

Remove all clothing. Use a sponge, cloth, or sheet soaked in cool water to cool the skin, wetting the material often, or immerse the person in a bathtub filled with cool water.

See illustration on opposite page

Do convulsions occur?

No | Yes

Remove objects that may cause injury and place pillows or rolled blankets around head to prevent injury. Do not try to hold person down. Do not place anything between teeth.

Watch for breathing problems. If breathing stops, see *Artificial Respiration*, p. 4

Check temperature every 5-10 minutes until it drops to 100-102°F, then discontinue sponging or immersion. If you have no thermometer, continue cooling process until person feels cool

Is there a history of heart problems?

No | Yes

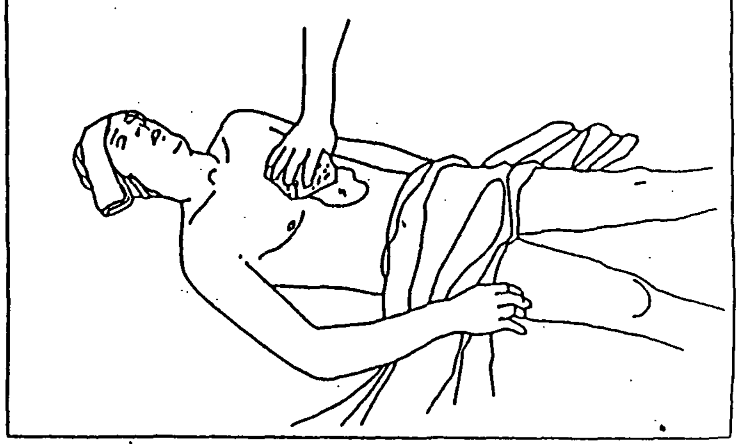
Have the person sit or lie in a comfortable position with a pillow behind head and shoulders.

Have the person lie flat. *Do not* cover unless chilled. Then cover lightly.

If emergency assistance has not been summoned, obtain help now.

If temperature begins to rise again repeat the cooling process

While awaiting assistance, keep person as cool and comfortable as possible and continue to watch for breathing problems. Check temperature frequently.



Remove all clothing. Use a sponge or cloth soaked in cool water to cool the skin.

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Figure 4.2

Reproduced from *Emergency Medical Procedures for the Home, Auto & Workplace*, revised edition, by The Deltakron Institute. New York: Prentice-Hall Press, 1987.

Noise

The field team may be exposed to excessive noise levels if vehicles or industrial equipment is operating at the site. Therefore, hearing protection will be available for use as appropriate.

Snake Hazards

It is not likely that snakes may be encountered at the site. However, long pants and high boots or snake guards will be worn during site activities to avoid a snake hazard. Never reach into a bushy area before checking for snakes by probing the area with a stick and listening for movement in the brush. Workers will use caution when working in areas where snakes may be present.

If a worker is bitten by a poisonous snake, the following steps should be taken:

- Attempt to identify the type of snake and its location,
- Keep the victim calm and minimize movement,
- Apply ice to the area bitten, and
- Transport victim to the nearest medical facility.

SAFE WORK PRACTICES

To ensure a strong safety awareness program during the sampling inspection, personnel must have adequate training. The Health and Safety Plan must be read by each member of the field team before conducting field activities and briefed to the field team at the beginning of each sampling day. A safety awareness must be developed and communicated to all members of the field team. All members of the field team will adhere to the following safety requirements while conducting field work for this sampling effort:

- No smoking, eating, or drinking carbonated beverages while at the site.
- Do not carry matches, lighters, or other ignition sources on the site.
- Facial hair will not be allowed where respirators contact the face.
- Contact lenses will not be worn during field work.
- Alcoholic beverages will not be permitted in state vehicles.

- Always use the "buddy" system while performing field work.
- Avoid walking through puddles or stained soil.
- Discovery of unusual or unexpected conditions will result in immediate evaluation and reassessment of site conditions and health and safety practices.
- A safety briefing will be performed each day prior to on-site work beginning.
- Other safety meetings may be conducted, as necessary.
- Take precautions to reduce injuries from field equipment and other tools.

All personnel will check their equipment at least two weeks before going into the field in case replacements are necessary. For respirator users, the correct corresponding cartridge or canister for the user's respirator will be verified before entering the site.

Tyvek coveralls, neoprene or nitrile gloves, hard hats, and rubber steel-toed boots or steel-toed shoes or boots will be worn by all personnel performing sampling activities. (Tyvek is optional if plastic sheeting is used to kneel on during soil sampling.) Safety glasses/sunglasses will be worn at all times to prevent eye irritation from particulate.

Groundwater samples will be collected from a domestic wells reported near the site. Care will be taken to avoid direct contact with the water purged or sampled from these wells. Splash protection for use during well sampling will be available, as needed.

SECTION 5

PERSONNEL PROTECTION EQUIPMENT AND MONITORING

RESPIRATORY PROTECTION

The chemicals that may be present at the site are listed in Section 2, List of Chemicals Used On Site. Some chemical information sheets and Material Safety Data Sheets (MSDS) for the specific products/chemicals formerly used or found at the site are presented in Appendix B. Visual inspection will be used to detect the presence of any remaining chemicals by noting stained or vegetation stressed areas during the initial walk through. As a final precaution, during the sample collection efforts, warning symptoms such as headaches and nausea and observations of unusual vapors, mists, or clouds, will require using readily available respiratory protective equipment or immediate evacuation of the area.

PERSONAL PROTECTION

The required personal protection clothing will be worn during on-site inspections, especially during all sampling events, except where down-grades are acceptable:

<u>Level D (Modified)</u>

- Coveralls (i.e., tyvek), neoprene, PVC, or rubber boots (steel toe), inner vinyl or latex surgical gloves, outer neoprene work gloves, full-face respirator with organic and particulate filters, and a hard hat.

- Coveralls will be taped at wrists and ankles. Respirator cartridges to be used will bear NIOSH/MSHA approvals. Respirator cartridges will be changed once daily or when recommended exposure is reached to minimize the potential for break-through. If break-through occurs, cartridges must be changed.

If a down-grade is deemed acceptable:

<u>Level D</u>

- Tyvek (non-chemical resistant) coveralls, neoprene, PVC, rubber, or leather work boots (steel toe), optional inner vinyl or latex surgical gloves, outer neoprene work glove, optional goggles or face masks, and a hard hat.

MEDICAL SURVEILLANCE

Each field member must be a current participant in the TRNCC Health Monitoring Program, and must have already had their initial physical examination prior to entering this or any site where a potential exists for exposure to hazardous chemicals.

Each team member will acknowledge that they have had a current annual physical by signature on the Plan Acceptance Form and that they are medically fit to perform team tasks as assigned. If there are any medical restrictions on a team member's utilization, these restrictions must be provided in writing to the Site Safety Officer as noted by a physician as soon as possible before the field work begins. These restrictions will be complied with at all times while performing team tasks. If the team member cannot perform the task as required, another team member will be selected to perform the task.

SITE SPECIFIC TRAINING

The Site Safety Officer will be responsible for developing a hazard awareness briefing for all TNRCC personnel that are to perform team member tasks on the site, and other visiting personnel, as necessary. If other personnel visit the site during the sampling inspection and wish to participate, they will be required to review the Health and Safety Plan and/or receive a hazard awareness briefing from the Site Safety Officer before entering the site. This training will be acknowledged by signature of the visiting personnel on the Plan Acceptance Form (Appendix A). A daily safety meeting will be held prior to entering the site each day and a Site Safety Briefing Form completed (See Appendix C). The safety meeting will consist of the following topics:

<u>SITE SAFETY BRIEFING</u> (Held Each Day)

- Roll call - identify the team member responsible for site safety and health. Assure the Plan Acceptance Form has been signed by each team member.
- Discuss safety, health, and other issues that may effect the tasks assigned.
- Discuss/review proper use of personal protective equipment.
- Review work practices by which the employee can minimize risk from hazards.
- Discuss safe operation of engineering controls and equipment used on the site.
- Review potential chemicals and acute effects of the chemicals at the site.
- Review evacuation routes, signals, and emergency evacuation procedures.

- Review decontamination procedures, assign decontamination tasks.

- Assign designated area to meet in case work area must be evacuated.

- Review "buddy" system procedures.

The Site Safety Officer shall be familiar with the operation, calibration, and limitations of all field monitoring equipment. In addition, the field team should have the following health and safety items readily available:

- Copy of the Health and Safety Plan,

- First aid and snake bite kits, including ice,

- Emergency eyewash bottle,

- Air sampling/monitoring equipment (photoionization detector, etc,),

- Oxygen/combustible gas indicator (as required),

- Fire extinguisher, and

- Distilled water (for eyewash bottle refill and decontamination procedures).

SECTION 6

FREQUENCY AND TYPES OF AIR MONITORING

The need for air monitoring equipment and frequency will be determined on a site-specific basis by anticipated respiratory concerns at the area (i.e., background samples taken off-site may not need air monitoring equipment). Table 7.1 lists the chemicals known to exist at the site and the TLV, PEL, and other pertinent information for each chemical. Table 7.2 lists the same information for the decontamination and preservation chemicals which may be used at this site.

Table 6.1 Chemicals of Record at the Old Brazos Forge Site (From NIOSH & ACDIH Pocket Guides)

Possible Chemical Contaminants	**NIOSH REL** (Recommended exposure level for 10 hr wk day/40 hr week) ST (short term exposure level/15 minutes)	**PEL** (Permissible exposure limit for 8 hr days in a 40 hr week) ST (short term exposure level/15 minutes)	**TLV** (Threshold Limit Values for 8 hours) **only listed if more stringent than PEL	**IDLH** (Immediate Dangerous to life or health concentrations	**Symptoms of Exposure** (inhalation; skin absorption)
Lead	0.1 mg/m^3	0.05 mg/m^3	**	700 mg/m^3	Ingestion: pallor; pal eye, anorexia
Chromium	0.5 mg/m^3	1.0 mg/m^3	**	250 mg/m^3	eye, skin, and lung irritation
Copper	1.0 mg/m^3	1.0 mg/m^3	**	100 mg/m^3	Irritated eyes and nose, metallic taste, anemia
Nickle	0.015 mg/m^3	1.0 mg/m^3	**	10 mg/m^3	Allergic asthma, sens derm, pneuitis
Zinc	5.0 mg/m^3	5.0 mg/m^3	**	500 mg/m^3	Fever, chills, muscle ache, naussea, dry throat, cough, weak, blurred vision, low back pain, vomitting, fatigue, tight chest
Cyanide	5.0 mg/m^3	5.0 mg/m^3	**	50 mg/m^3	Asphyxiation, weakness, naussea, vomitting, increased respiration, slow gasping respiration, eye and skin irritation,death
Cadmium	Carcinogen/reduce exposure as much as feasible	0.2 mg/m^3 Ceiling/0.3 mg/m^3	**	Carcinogen 9 mg/m^3	Pulmonary edema, dyspnea; Cough, chest tight, substernal pain; headaches, chills, muscle aches, nausea, vomiting, diarrhea, anosmia, emphysema, proteinuria, mild anemia; carcinogen

ND = Not determined. Reduce exposure to lowest feasible concentrations.
N/A = Not available
ppm = Parts per million
ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
STEL = Short Term Exposure Limit.

Table 6.2 Chemicals of Record Used for Field Investigations

Chemical	TLV a/	(OSHA) PEL b/	Odor Threshold (ppm)	IDLH c/ (ppm)	Comments
Hexane	50	500		500	Calibration for HNU PI-101 photoionization detector. No anticipated problems since hexane in cylinder is only 0.14 percent by volume with air.
Nitric Acid	2	2		100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Hydrochloric Acid	(C),5	(C),5	1-5	100	Very corrosive sample preservative agent. Avoid contact with skin, eyes, and clothing. Store bottle in an upright secure position. Do not preserve water samples suspected of containing cyanide compounds.
Isopropanol	400			12,000	Decontamination fluid. Wear gloves when cleaning equipment.

ppm = Parts per million
ca = Carcinogen
a/TLV-TWA = Threshold limit value, time weighted average. OSHA-enforced average air concentration to which a worker may be exposed for an 8-hour workday without harm.
b/PEL = Permissible exposure limit. Average air concentration (same definition as TLV, above) as recommended by the American Conference of Governmental and Industrial Hygienists (ACGIH).
c/IDLH = Immediately dangerous to life or health. Air concentration at which an unprotected worker can escape without debilitating injury or health effects. Expressed as ppm unless noted otherwise.
(C) = denotes Ceiling limit

SECTION 7

ACCIDENT PREVENTION AND CONTINGENCY PLAN

ACCIDENT PREVENTION

All field personnel will receive health and safety training prior to the initiation of any site activities. On a day-to-day basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and for signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Before beginning the site investigation, a meeting will be held to discuss accident prevention (see Section 5, Site Safety Briefing). The discussion should cover but not be limited to:

- Tasks to be performed; time constraints (e.g., rest breaks);
- Hazards that may be encountered, including their effects, how to recognize symptoms or monitor them, concentration limits, or other danger signals; and emergency medical procedures.
- Emergency evacuation procedures.

Buddy System

The "buddy" system will be used at all times by all TNRCC field personnel while performing work related tasks on site. All activities must be conducted with a partner (buddy) who can:

- Provide his or her partner with assistance;
- Observe his or her partner for signs of chemical or weather exposure; and
- Notify the Site Safety Officer or others if emergency help is needed.

CONTINGENCY PLAN

Emergency Procedures

In the event that an emergency develops on site, the procedures delineated herein are to be immediately followed. Emergency conditions are considered to exist if:

- Any member of the field crew is involved in an accident or experiences any adverse effects or symptoms of exposure while on site, or

- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

Chemical Exposure

If a member of the field crew demonstrates symptoms of chemical exposure, the procedures outlined below should be followed:

- Another team member (buddy) should remove the individual from the immediate area of contamination. The buddy should then notify the Site Safety Officer of the chemical exposure. The Site Investigation Manager should contact the appropriate emergency response agency.

- If the chemical is on the individual's clothing, the chemical should be neutralized or removed (if it is safe to do so).

- If the chemical has contacted the skin, the skin should be washed immediately with copious amounts of water.

- In case of eye contact, the emergency eye-wash solution should be used. Eyes should be washed for at least 15 minutes using available distilled water.

- All chemical exposure incidents must be reported to the Region/Central Office Staff Safety Offices. The Site Investigation Manager is responsible for reporting the chemical exposure incident and assist the individual's supervisor in submitting a written report (see Appendix A).

Personal Injury

In case of personal injury at the site, the following procedures should be followed:

- A team member should signal the other team member that an injury has occurred.

- A field team member trained in first aid can administer immediate treatment to the injury.

- The victim should then be transported (if applicable) to the nearest hospital or medical center, or stabilized so that further injury does not occur.

- The Site Investigation Manager is responsible for making certain that an accident report form is completed and submitted to the Region and Central

Office Staff Safety Offices. Follow-up action should be taken to correct the situation that caused the accident.

Evacuation Procedures

- The Site Safety Officer will determine whether an evacuation is necessary.
- All personnel in the work area should evacuate the area and meet in the predesignated area.
- Account for all personnel. Wait for further instructions from the Site Safety Officer.

SECTION 8

SITE-SPECIFIC DECONTAMINATION PROCEDURES

Prior to leaving the site, personnel protective and sampling equipment will be decontaminated. Decontamination procedures will be conducted as follows:

- Remove and wash goggles or safety glasses (if used),
- Remove and wash chemical protective boots, gloves,
- Wash sampling equipment to remove gross contamination, and
- Wash hands and face.

Protective gloves will be placed in garbage bags and disposed of appropriately at the conclusion of site activities. Sampling equipment will be placed in plastic bags for final decontamination at the conclusion of site activities.

PERSONNEL DECONTAMINATION PROCEDURES

The TNRCC field team will establish an on-site decontamination station. An area will be set up during initial field activities prior to any sampling event. The decontamination station will have provisions for collecting disposable protective equipment; for washing boots, gloves, field instruments, sampling tools (if required); and for washing hands, face, and other exposed body parts. Investigation derived waste (IDW) from decontamination will be properly disposed in accordance with EPA guidelines outlined in the EPA/540/G-91/009, May 1991 handbook.

Decontamination equipment will include, as necessary:

- Plastic buckets, pails, and scrub brushes
- Non-phosphate detergent
- Isopropyl alcohol
- Paper towels
- Plastic garbage bags, sheets of plastic

- Deionized and potable water.

SECTION 9

DOCUMENTATION AND NOTIFICATION

LOGBOOK DOCUMENTATION REQUIREMENTS

Implementation of the Health and Safety Plan will be recorded in the field log book. Recordes information to be recorded shall include:

- Weather conditions at the time of the inspection (daily entry),
- Names of the personnel on-site (daily entry),
- Levels of personal protective equipment worn by the field personnel (specifically note conditions or rational for down- or up-grading PPE),
- Monitoring instrument readings,
- Subjects discussed during site health and safety briefings, and
- All safety violations.

A Health and Safety Checklist has been included in Appendix C to assist the Site Safety Officer in assuring that appropriate safety consideration have been covered in the daily safety briefing.

EPA NOTIFICATION OF IMMINENT DANGER TO THE GENERAL PUBLIC

If there is an imminent danger that the general public may come into direct contact with hazardous substances or wastes, which are readily accessible on-site, the Site Investigation Manager will notify the Project Manager who will notify the EPA no later than one (1) day after the inspection team returns from the site. Written notification will follow any verbal communication in regard.

SECTION 10

CONFINED SPACE ENTRY

A "Confined Space" means that a space:

1) is large enough and so configured that an employee can bodily enter and perform assigned work;
2) has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and
3) is not designed for continuous employee occupancy.

Should confined spaces be required to be inspected for a SSI, the Site Project Manager will be responsible for evaluating the site to determine if any confined spaces meet the definition of a permit-required confined space. "Permit-required confined space" means a confined space that has one or more of the following characteristics:

1) contains or has a potential to contain a hazardous atmosphere;
2) contains material that has the potential for engulfing an entrant;
3) has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
4) contains any other recognized serious safety or health hazard.

If permit-required confined spaces are observed on site and are required to be investigated, the Sit Project Manager, or any other team member, will not enter these spaces and will notify the Staff Health and Safety Officer, who will arrange for certified personnel who can work in permit-required confined spaces.

APPENDIX A

HEALTH AND SAFETY CHECKLIST

_ 1. Conduct safety briefing (each day).

_ 2. Conduct initial site survey (first day).

_ 3. Personal Protective Equipment: Tyvek (or chemical resistant suit) coveralls, boots, inner and outer gloves, respirator and matching organic and particulate filter canisters, hard hat, and goggles.

_ 4. Copy of HASP.

_ 5. First aid and snakebite kits, including ice.

_ 6. Calibrated air monitoring devices.

_ 7. Water.

_ 8. Emergency contact list and map to hospital (or mark in HASP).

_ 9. Appropriate weather gear (i.e., rain gear, cold weather clothing, etc.)

_ 10. Copy of SSI Workplan.

PLAN ACCEPTANCE FORM

SUMMARY OF ACTIVITIES

ACCEPTANCE

I have read the Health and Safety plan (or been briefed on the hazards) for Screening Site Inspection (SSI) field work to be conducted at the Voda Petroleum, Inc. Site located in Gregg County, Texas, and agree to abide by the rules and guidelines contained therein. I acknowledge that I have had a current annual physical within the last 12-month period from the date signed below, and am medically cleared to perform my tasks as outlined.

______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________
Name	Signature	Date
______________________	______________________	__________

SITE SAFETY BRIEFING

Job Number (Site) ____Old Brazos Forge Site________________ Number TXD048901235

Date ________ Start Time ________ Completed ________

Site Location ____

Type of Work (General) ______________________________________

****

SAFETY ISSUES

Tasks (this shift) ____

____ Protective

Clothing/Equipment ____

____

Physical Hazards ____

____ Control Methods

____

____ Chemical Hazards ________

____

____ Decontamination Procedures/Tasks ________

____

______________________________ Evacuation Procedures/Route/Signals ________________

____

______________________ Evacuation Meeting Area ___________________________________

____

Nearest Phone ____

Hospital Name/Address ____

Special Topics (incidents, actions taken, etc.) ______________________________

____

____

____

****

ATTENDESS

Print Name	Sign Name

Meeting conducted by: ____

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

AUSTIN TEXAS

MEMORANDUM

RECEIVED

OCT 27 1993

TO: All TNRCC SUPERVISORS

FROM: Walter E. Keith WEK
Workers' Compensation Claims Coordinator

DATE: August 6, 1993

SUBJECT: Reporting Procedures For Workers' Compensation Claims

All TNRCC employees are encouraged to report any accident to their supervisor immediately. Accidents involving an "on-the-job" injury resulting in a medical expense and/or lost time must be reported. In the absence of an immediate supervisor, employees should report to the person left in charge or someone else in a supervisory capacity.

The supervisor upon being informed of an employee injury should immediately contact Walter E. Keith, Workers' Compensation Claims Coordinator for the agency, by calling 512/908-1819. Follow-up correspondence such as witness statements should be sent to the Workers' Compensation Claims Coordinator at 12124 Park 35 Circle, Austin, TX 78753 either by fax 512/908-1212 or by mail.

All Employee injuries involving lost time or medical payment must be reported to the State Employees Division of the Attorney General's Office followed by the necessary paperwork within two calendar days.

Supervisors should pay particular attention to the TWCC 1S form attached. You will be required to supply much of the information for the completion of this form. Please be prepared to communicate telephonically the information to satisfy items 1 through 33. I will supply data to satisfy items 34 through 51.

It is important that supervisors are aware of the following:

(a) Item 9 - Mailing Address: Home address of the injured employee. You must include the COUNTY.
(b) Item 30 - Date of Hire: Agency hire-in date of employee.
(c) Item 33 - Length of Service in Occupation: Time indicated may differ with the date of hire.

Please note that recent staff reorganizations have shifted the Workers' Compensation function from the Human Resources Division to the Risk Management Section. As we all adjust to this change, I want you to know that I appreciate your interest and concern to help make our Workers' Compensation Claim Procedures operate smoothly. Our ultimate goal is to have NO workers' compensation claims to process, if and/or when the occasion does arise, I look forward to working with you. Thank you and please do not hesitate to call me if you have any questions.

ATTACHMENT

OFFICE OF THE ATTORNEY GENERAL
Workers' Compensation Division
P. O. Box 13777
Austin, Texas 78711
Please read instruction sheet CAREFULLY, giving special attention to items marked with an asterisk (*)

TWCC CLAIM #

DIRECTOR'S #

EMPLOYER'S FIRST REPORT OF INJURY OR ILLNESS

1. Name (Last, First, M.I.)
2. Sex F ☐ M ☐
3. Social Security Number - -
4. Home Phone ( )
5. Date of birth (m-d-y) - -
6. Does the Employee Speak English? If No, Specify Language YES ☐ NO ☐ WORK PHONE ( ) -
7. Race White ☐ Black ☐ Asian ☐
8. Ethnicity Hispanic ☐ Other ☐ Native American ☐
9. Mailing Address Street or P.O. Box
City State ZIP Code County
10. Marital Status Married ☐ Widowed ☐ Separated ☐ Single ☐ Divorced ☐
11. Number of Dependent Children
12. Spouse's Name
13. Doctor's Name
14. Doctor's Mailing Address (Street or P.O. Box)
City State ZIP Code
DR'S PHONE # ( ) -

15. Date of Injury (m-d-y) - -
16. Time of Injury : am ☐ pm ☐
17. Date Lost Time Be(gan) (m-d-y) - -
18. Nature of Injury*
19. Part of Body Injured or Exposed*
20. How and Why Accident/Injury Occurred*
21. Was employee doing his regular job? YES ☐ NO ☐
22. Worksite Location of Injury (stairs, dock, e...)
23. Address Where Injury or Exposure Occurred
Name of business if incident occurred on a business site
Street or P.O. Box County
City State ZIP Code
24. Cause of Injury (fall, tool, machine, etc.)*
25. List Witnesses
26. Return to work date/or expected (m-d-y) - -
27. Did employee die? YES ☐ NO ☐
28. Supervisor's Name
29. Date repor(ted) (m-d-y) - -

30. Date of Hire (m-d-y) - -
31. Was employee hired or recruited in Texas? YES ☐ NO ☐
32. Length of Service in Current Position Months ______ Years ______
33. Length of Service in Occupation Months ______ Years ______
34. State Payroll Classification Code
35. Occupation of Injured Worker
36. Rate of Pay at this Job $ ______ Hourly $ ______ Weekly $ ______ Monthly
37. Full Work Week is: ______ Hours ______ Days
38. Last Paycheck was: $ ______
39. Is employee an Owner, Partne(r) or Corporate Officer? YES ☐ NO ☒

40. Name and Title of Person Completing Form
Claim Coordinator
41. Name of Agency
42. Agency Mailing Address and Telephone Number
Street or P.O. Box Telephone ( )
City State ZIP Code
43. Agency Location (If different from mailing address)
Number and Street
City State ZIP Code
44. Federal Tax Identification Number
9998
45. Primary Standard Industrial Classification Code (SIC)* (4 digit)
46. Specific SIC Code* (4 digit)
47. Comptroller Agency C(ode)
48. Workers' Compensation Insurance Company
State Employee's Division, Attorney General's Office
49. Policy Number
TXSTATEPOL0001
50. Did you request accident prevention services in past 12 months? YES ☐ NO ☐ If yes, did you receive them? YES ☐ NO ☐
52. Number of Hours of Sick Leave Credited to Employee on Date of Injury

Signature and Title (READ INSTRUCTIONS ON INSTRUCTION SHEET BEFORE SIGNING)

X______________________________ Claim Coordinator Date ______________

TWCC-15 (3-91)

Rule 1

RISK MANAGEMENT

TACB SUPPLEMENTAL INSTRUCTIONS FOR COMPLETION TWC
FORM TWCC-121

Supervisor's Investigation of Employee's Accident/Incident

1. All thirteen (13) blocks in the heading must be completed. To assist in this area, note the following:

Block	Instructions
7. Date of Employment in Unit	Use date employee arrived in your work section. (This date may differ from date of employment with the Agency.)
8. Agency Number	a) For TACB, this number is 519 b) For TWC, this number is 582
9. Budget Number of Assigned Unit	This is a four-digit budget number (program activity) that, if not known, can be found by contacting your budget office or by looking at the employee's monthly earnings statement. On that statement, the budget number is the first four (4) digits to the right of the employee's name.
10. Job Classification Code	This may be alpha-numeric (a letter and 3 numbers), but it is usually a four-digit number established by the State Auditor's Office. For example, an Occupational Safety Manager I has a Job Classification Code of 2752. As a last resort, this number may be obtained from the Personnel Office.

2. Be meticulous when completing Blocks A - N. Data is intended at all levels for Accident Prevention Analysis (not disciplinary action).

3. Supervisors are expected to conduct the investigation and to complete Blocks A-N on the form. ADSOs can assist, but should not be tasked to do the investigation.

4. Once the TWCC-121 is filled out through Block P. 2, the completed form is sent through distribution to the Agency Risk Manager and not inadvertently forwarded to the Texas Workers' Compensation Commission.

5. Form should be locally reproduced as needed.

6. Questions concerning this form and its use should be addressed to the Agency Risk Manager and Safety Director at (512) 208-1913 (TXAN: 247-1913).

1. LAST NAME OF INJURED	2. FIRST NAME	3. M.I.	4. SOCIAL SECURITY NUMBER	5. DATE OF BIRTH
			- -	/ /

6. SEX	7. DATE OF EMPLOYMENT IN UNIT	8. AGENCY NUMBER (COMPTROLLER'S CODE)	9. BUDGET NUMBER OF ASSIGNED UNIT
M ☐ F ☐	/ /		

10. JOB CLASSIFICATION CODE	11. POSITION STATUS	12. DATE OF INCIDENT	13. TIME OF INCIDENT
	☐ Full-time ☐ Part-time ☐ Floater (fills where needed)	/ /	: a.m. ☐ p.m. ☐

A. EXTENT OF INJURY (Check one only)

- ☐ 01 No injury (incident only)
- ☐ 02 Injury not requiring a TWCC-1
- ☐ 03 Medical
- ☐ 04 Lost time only (more than one day)
- ☐ 05 Medical and lost time
- ☐ 06 Fatality

B. CATEGORY (Check one only)

- ☐ 01 Occupational injury (accident)
- ☐ 02 Occupational injury (aggressive behavior)
- ☐ 03 Occupational illness/disease

C. SPECIFIC LOCATION OF OCCURRENCE (Check one only)

INDOORS:
BUILDING INVENTORY NO. ______

- ☐ 01 Auditorium
- ☐ 02 Bath/Toilet area
- ☐ 03 Boiler room
- ☐ 04 Canteen/Snack bar
- ☐ 05 Cell block
- ☐ 06 Classroom
- ☐ 07 Closet
- ☐ 08 Day room
- ☐ 09 Dormitory/Living room
- ☐ 10 Elevator
- ☐ 11 Food service area/Dining/Kitchen
- ☐ 12 Garage
- ☐ 13 Gymnasium/Recreation
- ☐ 14 Hallway/Corridor
- ☐ 15 Hospital/Clinic/Dispensary
- ☐ 16 Laboratory
- ☐ 17 Laundry
- ☐ 18 Library
- ☐ 19 Nursing station
- ☐ 20 Office areas
- ☐ 21 Program areas
- ☐ 22 Ramp
- ☐ 23 Sales store/Outlet
- ☐ 24 Seclusion room
- ☐ 25 Sleeping room
- ☐ 26 Steps/Stairs/Stairway
- ☐ 27 Storage area
- ☐ 28 Waiting room
- ☐ 29 Workshop/Technical trades
- ☐ 30 Other (specify) ______

OUTDOORS:

- ☐ 31 Athletic field
- ☐ 32 Campus
- ☐ 33 Grounds
- ☐ 34 Highway/Road/Street
- ☐ 35 Loading dock
- ☐ 36 Park or recreation area
- ☐ 37 Parking lot
- ☐ 38 Roof
- ☐ 39 Sidewalk
- ☐ 40 Steps/Stairs/Stairway
- ☐ 41 Storage area
- ☐ 42 Swimming pool area
- ☐ 43 Tower
- ☐ 44 Other (specify) ______

D. ACTIVITY ENGAGED IN BY INJURED AT TIME OF INJURY (Check one only)

- ☐ 01 Bathing
- ☐ 02 Buffing
- ☐ 03 Carrying
- ☐ 04 Cleaning
- ☐ 05 Climbing
- ☐ 06 Cutting
- ☐ 07 Descending
- ☐ 08 Digging
- ☐ 09 Dressing
- ☐ 10 Driving
- ☐ 11 Eating
- ☐ 12 Escorting
- ☐ 13 Exercising
- ☐ 14 Feeding
- ☐ 15 Grinding
- ☐ 16 Grooming
- ☐ 17 Jumping
- ☐ 18 Lifting
- ☐ 19 Loading
- ☐ 20 Mopping
- ☐ 21 Moving
- ☐ 22 Operating
- ☐ 23 Pulling
- ☐ 24 Pushing
- ☐ 25 Reaching
- ☐ 26 Redirecting
- ☐ 27 Restraining
- ☐ 28 Running
- ☐ 29 Sanding
- ☐ 30 Sawing
- ☐ 31 Searching
- ☐ 32 Securing
- ☐ 33 Sitting
- ☐ 34 Standing
- ☐ 35 Stripping
- ☐ 36 Turning
- ☐ 37 Walking
- ☐ 38 Welding
- ☐ 39 Other (specify) ______

E. BODY PART INJURED (Most serious)

- ☐ 01 Ankle
- ☐ 02 Arm
- ☐ 03 Back
- ☐ 04 Buttocks
- ☐ 05 Cheek
- ☐ 06 Chest
- ☐ 07 Chin
- ☐ 08 Ear(s)
- ☐ 09 Eye(s)
- ☐ 10 Foot-Feet
- ☐ 11 Finger/Thumb(s)
- ☐ 12 Forehead
- ☐ 13 Groin
- ☐ 14 Hand
- ☐ 15 Hips
- ☐ 16 Internal organs
- ☐ 17 Jaw
- ☐ 18 Knee(s)
- ☐ 19 Leg(s)
- ☐ 20 Mouth
- ☐ 21 Neck
- ☐ 22 Nose
- ☐ 23 Pelvis
- ☐ 24 Rib(s)
- ☐ 25 Scalp
- ☐ 26 Shoulder
- ☐ 27 Toe(s)
- ☐ 28 Wrist(s)
- ☐ 29 Other (specify) ______

F. TYPE OF INJURY (Check primary one)

- ☐ 01 Abrasion
- ☐ 02 Amputation
- ☐ 03 Bite
- ☐ 04 Bruise
- ☐ 05 Burn
- ☐ 06 Concussion
- ☐ 07 Cut
- ☐ 08 Dermatitis
- ☐ 09 Dislocation
- ☐ 10 Foreign object
- ☐ 11 Fracture
- ☐ 12 Frostbite
- ☐ 13 Hearing loss
- ☐ 14 Heart attack
- ☐ 15 Heat exhaustion
- ☐ 16 Hernia
- ☐ 17 Infection
- ☐ 18 Inflammation
- ☐ 19 Internal injuries
- ☐ 20 Puncture
- ☐ 21 Rupture
- ☐ 22 Scratch
- ☐ 23 Shock
- ☐ 24 Sprain
- ☐ 25 Sting
- ☐ 26 Strain
- ☐ 27 Other (specify) ______

G. TYPE OF OCCURRENCE (Check one only)

- ☐ 01 Aggression (client, student, inmate, patient)
- ☐ 02 Bodily reaction (drug, medications)
- ☐ 03 Caught in, on, under, or between
- ☐ 04 Contact with chemicals
- ☐ 05 Contact with electric current
- ☐ 06 Contact with temperature extremes

G. CONTINUED

- ☐ 07 Fall on same level
- ☐ 08 Fall on different level
- ☐ 09 Over-exertion (exceeding physical ability resulting in strain, rupture)
- ☐ 10 Overexposure to environmental hazards (noise, toxic
- ☐ 11 Slip (not a fall)
- ☐ 12 Struck against (rough, sharp object)
- ☐ 13 Struck by falling, moving object
- ☐ 14 Other (specify) ______

H. PHYSICAL THING MOST CLOSELY ASSOCIATED WITH OCCURRENCE (Check one

- ☐ 01 Aircraft
- ☐ 02 Air pressure
- ☐ 03 Animal (snake, dog, horse, etc.)
- ☐ 04 Athletic equipment (baseball, bat, dart, etc.)
- ☐ 05 Attachments (belt, pulley, gear, shaft)
- ☐ 06 Building component
- ☐ 07 Cabinet
- ☐ 08 Chemical (solid, liquid, or gas)
- ☐ 09 Clothing
- ☐ 10 Container (bottle, box, barrel, cylinder, etc.)
- ☐ 11 Curb
- ☐ 12 Doors (automatic, manual, revolving)
- ☐ 13 Drugs or medicine
- ☐ 14 Dust
- ☐ 15 Electrical apparatus
- ☐ 16 Elevator, escalator
- ☐ 17 Explosives
- ☐ 18 Eyewear
- ☐ 19 Fan
- ☐ 20 Fire, flame, smoke
- ☐ 21 Floor
- ☐ 22 Food products
- ☐ 23 Fumes
- ☐ 24 Furniture, fixtures
- ☐ 25 Gas
- ☐ 26 Glass items
- ☐ 27 Gun
- ☐ 28 Ground (earth)
- ☐ 29 Hand tool
- ☐ 30 Heating equipment
- ☐ 31 Hoisting equipment
- ☐ 32 Icy condition
- ☐ 33 Infectious or parasitic agent
- ☐ 34 Inmate, client, employee
- ☐ 35 Insect
- ☐ 36 Kitchen equipment
- ☐ 37 Knife
- ☐ 38 Lighting fixture and equipment
- ☐ 39 Ladder, scaffold
- ☐ 40 Locker
- ☐ 41 Machine
- ☐ 42 Material handling equipment
- ☐ 43 Metal
- ☐ 44 Mineral items (asphalt, clay, gravel, etc.)
- ☐ 45 Motor vehicle
- ☐ 46 Needle
- ☐ 47 Office equipment (chair, desk, cabinet, etc.)
- ☐ 48 Paint
- ☐ 49 Particle
- ☐ 50 Pavement
- ☐ 51 Person (other than client, inmate, employee)
- ☐ 52 Pipe
- ☐ 53 Platform, dock, ramp

- ☐ 54 Pole
- ☐ 55 Power tool or machinery (lathe, saw, etc.)
- ☐ 56 Radiating equipment (microwave, x ray, etc.)
- ☐ 57 Receptacle
- ☐ 58 Smoke
- ☐ 59 Stair, step
- ☐ 60 Sun
- ☐ 61 Trench/Ditch
- ☐ 62 Vegetation
- ☐ 63 Weather
- ☐ 64 Wood
- ☐ 65 Other (specify) ____________

I. ACT/PRACTICE ASSOCIATED WITH OCCURRENCE (Check one only)

- ☐ 01 Contact with electrical source (tool, device, wire, etc.)
- ☐ 02 Entering an unauthorized area
- ☐ 03 Failure to practice safe driving technique
- ☐ 04 Failure to use established route or taking short cut
- ☐ 05 Failure to use handrail, grab bar
- ☐ 06 Failure to use lockout device
- ☐ 07 Failure to use/wear personal protective equipment (PPE)
- ☐ 08 Failure to warn of known hazards (i.e. no safety sign, light, barricade, instruction, etc.)
- ☐ 09 Failure to wear appropriate dress (shoes, shirt, blouse)
- ☐ 10 Handling (of object, material, item, thing)
- ☐ 11 Horseplay
- ☐ 12 Improper mixing or storing (non-compatible material, chemicals, etc.)
- ☐ 13 Improper placing or storing (materials, tools, equipment)
- ☐ 14 Lifting (including position, stance)
- ☐ 15 Making safety devices inoperative
- ☐ 16 No unsafe act/practice on the part of employee
- ☐ 17 Operating/Working at unsafe speed
- ☐ 18 Operating without proper authority/clearance
- ☐ 19 Over or unnecessary exposure to hazards (gas, fumes, dust, chemicals, mist, radiation, etc.)
- ☐ 20 Repairing or servicing moving object/thing (machine, equipment, etc.)
- ☐ 21 Riding moving equipment not designed for passengers
- ☐ 22 Unattentive (daydreaming, unaware, etc.)
- ☐ 23 Using unsafe/defective tool, material, equipment
- ☐ 24 Using wrong tool, material equipment
- ☐ 25 Working/Walking under suspended load (crane, hoist, derrick)
- ☐ 26 Working in a confined space without proper safeguard
- ☐ 27 Working without adequate lighting
- ☐ 28 Other (specify) ____________

J. CONDITION (PHYSICAL HAZARD) ASSOCIATED WITH OCCURRENCE (Check one)

- ☐ 01 Congested area
- ☐ 02 Electrical hazard (uninsulated wire, overloaded circuit, inadequate ground, etc.)
- ☐ 03 Excessive noise
- ☐ 04 Harmful animals/insects/reptiles
- ☐ 05 Health hazards (radiation, gas, fumes, dust, vapors, etc.)
- ☐ 06 Improper housekeeping
- ☐ 07 Improperly stored chemicals, hazardous substances
- ☐ 08 Inadequate ventilation
- ☐ 09 Inadequate or no warning signs
- ☐ 10 Layout or design (office, shop, equipment)
- ☐ 11 Lighting
- ☐ 12 Mislabeled/Unlabeled chemicals, hazardous materials, etc.
- ☐ 13 No unsafe condition
- ☐ 14 Open trench, hole, ditch, sharp drop-off
- ☐ 15 Poisonous vegetation (oak, ivy, etc.)
- ☐ 16 Protruding object (nail, wire, splinter, etc.)
- ☐ 17 Rough/Sharp objects
- ☐ 18 Slipping or tripping hazard
- ☐ 19 Step, stairs, ladder, or other working surfaces
- ☐ 20 Unguarded machine, belt, pulley, roller, etc.
- ☐ 21 Unsafe/Defective load or chemic
- ☐ 22 Unsafe equipment
- ☐ 23 Unsafe material
- ☐ 24 Unsafe vehicle
- ☐ 25 Unshored trench, excavation, etc.
- ☐ 26 Walkway, sidewalk, pavement
- ☐ 27 Other (specify) ____________

K. DID THE STATE OR THE UN SAFETY RULE, REGULATION STANDARD THAT WOULD H PREVENTED THE OCCURRE

☐ 01 Yes ☐ 0

L. WAS THE RULE, REGULATIO STANDARD VIOLATED?

☐ 01 Yes ☐ 0

M. ACTION(S) TAKEN OR PLAN TO PREVENT RECURRENCE (Check all that apply)

- ☐ 01 Action taken with employee for vi regulations or procedures
- ☐ 02 All employees were made aware occurrence cause, consequence, a to prevent recurrence
- ☐ 03 Employee given basic training
- ☐ 04 Employee given refresher or reme
- ☐ 05 Existing rule, regulation or standa enforced
- ☐ 06 Existing rule, regulation or standa revised
- ☐ 07 New rule, regulation or standard
- ☐ 08 Physical hazard(s) corrected
- ☐ 09 Other positive action taken ____

N. DESCRIBE BRIEFLY IN NARRATIVE FORM THE CIRCUMSTANCES THAT LED TO AND CAUSED THIS OCCURRENCE.

ANSWER: WHO? WHAT? WHERE? WHEN? WHY? AND HOW? (Use additional sheet if necessary)

INJURED'S IMMEDIATE SUPERVISOR (print)	SIGNATURE	DATE	PHONE
		/ /	( )

P. REVIEWED BY:

P.1 SECTION/DEPARTMENT/DIVISION ADDITIONAL DUTY SAFETY OFFICER. COMMENT:

	SIGNATURE	DATE
		/

P.2 SECTION/DEPARTMENT/DIVISION HEAD. COMMENT:

	SIGNATURE	DATE
		/

P.3 AGENCY OR FACILITY SAFETY MANAGER

A) Repeat occurrence: ☐ 01 No ☐ 02 Yes: total incidents: ☐ 03 Two ☐ 04 Three ☐ 05 Four ☐ 06 Five ☐

B) Were three (3) or more workers injured in this accident? (if so, complete a separate form for each employee) ☐ 01 Yes ☐ 02 No

C) Comment

/

APPENDIX C

APPENDIX B

APPENDIX E

Site Reconnaissance Checklist

SITE RECONNAISSANCE CHECKLIST

I. General
   1. Name and title of site contact.
   2. Telephone number.
   3. Site address.
   4. Mailing address (if different).
   5. Name of owner and/or operator.
   6. Mailing address.

II. Site History
   1. How long has current owner/operator been at site?
   2. What were previous uses of site? Who were previous owners?
   3. Size of site (acres).
   4. Is any other property used that is not contiguous with site?
   5. Permits (RCRA, TDH, etc.)
   6. Any past spills or other environmental or accident problems.
   7. What were previous waste management practices?

III. Current Operations
   1. What is currently being done at facility?
   2. What are waste management practices?
   3. What are hazardous chemical management practices?
   4. List major hazardous chemicals/constituents present and past.
   5. Discuss sources (e.g., tanks, impoundments, containers, etc.).
   6. Number of employees - current, peak.

IV. Source Characteristics
   1. Identify type of wastes and quantities disposed of at site.
      a. Identify source of information.
      b. Photograph.
      c. Dimension (quantity, volume, area) of waste locations.
      d. Containment controls (clay cap, clay liner, vegetative cover, etc.)
      e. Existing data.
      f. Condition/integrity of storage/disposal units.

Site Reconnaissance Checklist, continued

V. Groundwater Pathway

1. Distance from source to nearest well. Identify name and address of well owner, if possible - and estimate well usage (number of people served, irrigation, supplemental, etc.).
2. Verify wells within range of site. Indicate depth to water for each well and number of people served. Identify as many owners and addresses as practically feasible.
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
3. Aquifer nearest wells are screened in, and water quality.

VI. Surface Water Pathway

1. Identify the TNRCC Basin and Stream Segment where the site is located.
2. Describe surface water quality including:
   a. average discharge,
   b. total basin drainage area,
   c. TNRCC surface water quality monitoring stations.
3. Are there surface water bodies within 2 miles of site?
4. Provide sketch of surface water runoff and flow patterns for 15 stream-miles downstream.
5. identify intakes along surface water route within 15 stream-miles downstream.
6. What is water use at each intake.
7. Identify fisheries along the 15 stream-mile downstream pathway.
8. Identify sensitive environments along the 15 stream-mile downstream pathway (see attached list).
9. Identify downstream recreational uses.
10. Estimate approximate flow rates for each water body within the 15 stream-mile target distance (i.e., <10 cfs, 10-100 cfs, 100-1,000 cfs, 1,000- 10,000 cfs, etc.). Estimate length of each stream segment.
11. Identify the annual rainfall and net rainfall at the site.
12. Is site in flood plain (10 year, 100 year, 500 year)?
13. Estimate upgradient drainage area limits (watershed).
14. Draw a sketch of drainage from site to nearest surface water including any other contributing tributaries.
15. Identify recreational uses downstream (15 miles).

VII. Soil Exposure Pathway

1. Describe status of site access, fencing, gates, locks, condition of security controls.
2. Describe adjacent land use.
3. Describe off-site runoff patterns.

Site Reconnaissance Checklist, continued

4. Describe number of people with residence, school, or day care on-site or within 200 yds.
5. Locate nearest school or day care.
6. Number of workers on-site (include maximum number to cover work on-site).
7. Identify sensitive environments, (see list end of checklist).
8. Describe any off-site runoff pattern existing at the site.

VIII. Air Pathway

1. Estimate number of people within 4 miles (city or county records).
   a. 0 - 0.25 mile
   b. 0.25 - 0.50 mile
   c. 0.50 - 1.00 mile
   d. 1.00 - 2.00 mile
   e. 2.00 - 3.00 mile
   f. 3.00 - 4.00 mile
2. Shortest distance from source to occupied building.
3. Identify known releases to air.
4. Identify reports of adverse health effects.
5. Identify existence of sensitive environments within 4 miles (see end of checklist for list).

Miscellaneous Inquiries

1. Are any additional aerial photographs depicting site history available?
2. Meteorological data.
3. Nearest recreational area? Hospital?
4. Local water supply sources?

Site Sketches to Include

1. Date(s) of visit.
2. Well locations (including nearest to site).
3. Storage areas (past and present).
4. UST and above ground storage tanks.
5. Waste Areas.
6. Buildings
7. Access roads.
8. Areas of ponded water, or depressions in surface.
9. Drainage direction.
10. Photograph locations and directions.
11. Vegetation and significant landscaped features.
12. Any irregular appearance for soil, vegetation, tanks, etc. such as may result from spill, backfill operation, recent dirt moving work, etc.

APPENDIX F

References

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

TO: Wendy Rozacky, Chief
Enforcement Section
Industrial and Hazardous Waste Division

DATE: July 15, 1994

THRU: Ernerst Heyer, Manager
Field Support Section, Field Operations Division

THRU: Susan Bredehoft, Liaison
Industrial and Hazardous Waste, Field Operations Division

FROM: Donald E. Wyrick, Environmental Quality Specialist
Region 9 - Waco

SUBJECT: Enforcement Action: Reconversion Technologies of Texas, Inc. (RETEK), No TNRCC Solid Waste Registration Number, No EPA I.D. Number, Compliance Evaluation Inspection (CEI) conducted June 16, 1994.

Introduction:

On June 16, 1994, the writer and Ms. Connie Wong, Enforcement Coordinator, Industrial and Hazardous Waste (I&HW) Division, Texas Natural Resource Conservation Commission (TNRCC), contacted Mr. Ken Drum, Plant Manager, Reconversion Technologies of Texas, Inc. (RETEK) and conducted an I&HW Compliance Evaluation Inspection (CEI) and investigation at the facility located at 1709 Highway 36 North, Brenham, (Washington County), Texas 77833. The inspection and investigation was initiated in response to a request from Ms. Wong regarding a potential threat to public health and the environment, which exists at the site, documentation of current and historical violations associated with the site and in view of pending TNRCC enforcement action.

RETEK manufactures cattle trailer flooring, air conditioning pads, fencing and panels from plastic and rubber tire shavings. Wastes generated at the facility include used motor oil, hydraulic oil, scrap metal, card board, wooden pallets and miscellaneous paper trash. RETEK failed to notify the TNRCC Executive Director of waste streams generated and waste management activities. An unauthorized discharge of wastewater from the process operations building was observed during the inspection. Mr. Drum stated that the discharge was cooling water. An unauthorized discharge of wastewater was observed and documented at this location by Ms. Wong during an inspection conducted on January 5, 1993. A copy of an Inter-office memorandum from Ms. Wong to the Enforcement Screening Committee, which addresses this matter is provide as Attachment A.

RETEK is located on a 20 acre site approximately one mile northwest of Brenham. Old Brazos Forge (OBF), owned by Hussman Corporation, 12999 St. Charles Rock Road, Bridgeton, MO 63044, manufactured wire shelving products at this site from 1965 to May of 1988. Steal manufacturing and electroplating were conducted during that period. From 1965 to 1982 untreated cyanide, chromium, copper, zinc and nickel bearing sludges and wastewater from electroplating operations were discharged into earthen trenches which collected and conveyed the waste to three unlined surface impoundments located in series. A sketch of these facilities is provided as Attachment B. Overflow discharged through another earthen trench into an unnamed tributary of the Little Sandy Creek. Chemical analyses of sediment samples collected from the unnamed tributary of Little Sandy Creek revealed heavy metals contamination downstream of the waste management units.

Samples collected from the tributary by TNRCC Region 12 representatives in 1984, 1986 and 1987 revealed elevated concentrations of chromium, lead, nickel, zinc and copper. A letter dated May 27, 1987, was sent to mr. Dennis Barron, General Manager, OBF, requesting a response regarding remediation of the documented contamination. No information is available regarding any action initiated by the company to address this matter. Attachment C provides copies of the chemical analyses of samples collected from the tributary, the letter to OBF and other related correspondence. During the inspection conducted on June 16, 1994, three soil samples were collected from the streamed of the tributary at points upstream, adjacent to, and downstream of the hazardous waste disposal sites for chemical analysis. The test results will be provided when they are available.

Groundwater contamination resulting from releases at the RETEK facility site has been documented. Sixteen groundwater monitoring wells have been installed at the site. Four of these wells have been plugged. Only six wells are currently being monitored and two of these are located upgradient of the abandoned disposal sites. A groundwater quality assessment conducted in 1988 by Reed and Associates, Inc. revealed chromium, copper, nickel, and zinc contamination in on-site downgradient monitoring wells. The water quality assessment also identified significantly greater conductivity concentrations than background conductivity values. the pH, TOC and TOX concentrations showed significant changes in downgradient monitoring wells.

On July 6, 1992 the TWC District 7 office received a request for assistance from Ms. Sally Blum, Route 6 Box 6033, Brenham, Texas 77833, regarding possible contamination of her water well. Ms. Blum had water samples collected from her well tested and the analysis revealed chromium levels as high as .0502 mg/l. Ms. Blum's house is located approximately one-half mile from the RETEK facility and the well is ninety feet deep. On August 28, 1992, Field representative from the TWC District 7 office (Houston) collected two samples from Ms. blum's well. Chemical analyses of the samples revealed elevated chromium concentrations of .055 mg/l and .056 mg/l.

On July 5, 1993, Ms. Wong collected a water sample from the Blum well and the Sheild's well another water well located down gradient from the hazardous waste disposal sites at RETEK. The samples revealed 70 ug/l hexavalent chromium and 9.1 ug/l hexavalent chromium respectively. Hexavalent chromium does not naturally occur in nature and indicates an industrial source of contamination. On January 5, 1993, Ms. Wong also collected samples from groundwater monitoring wells designated as well MW-5 and well MW-12, located at the RETEK facility. Laboratory results revealed that well MW_5 had a total chromium concentration of .112 mg/l and well MW-12 had a total chromium concentration of .147 mg/l. These concentrations exceed chromium concentrations found in upgradient monitoring well MW-2 and MW-9 and also exceed the Federal Drinking Water Standard of .100 mg/l. The sample collected from well MW-12 revealed a hexavalent chromium concentration of 4.1 ug/l. Copies of the chemical analyses of samples collected from the two private water wells located downgradient of the RETEK facility and from monitoring wells located on RETEK property, a groundwater contamination report prepared by TNRCC Region 12 representative and associated correspondence regarding the request for assistance are provided as Attachment D.

RETEK's groundwater monitoring system does not appear to be adequate. According to Ms. Wong, the groundwater in the down gradient pathway is not being sufficiently monitored. There is only one downgradient well from the trench area disposal site, well MW-10. The groundwater flow from the trench area is to the southeast of well MW-10. This determination is based a review by Ms. Wong, of water contour maps dated 1985 through 1988 and other geological data available.

During the sampling events conducted at RETEK on January 5, 1993, Ms. Wong documented that the monitoring well samples were very cloudy and that this may indicate the need for rehabilitation of the wells due to silting problems.

During the June 16, 1994, inspection, it was noted that several of the wells did not have adequate surface pads, locking caps, monitoring well identification numbers or bumper guards. 55-gallon drums located near the wells for collection of purge water were in a deteriorated state and several had holes in them. The surface impoundment landfill and area of the monitoring wells was overgrown with weeds. Cracks were observed at the southwest corner of the landfill. Photographs indicating the deteriorated state of the purge drums, state of the wells and general lack of maintenance and provided at Attachment E.

TNRCC notice of violation (NOV) letter dated December 17, 1993, was sent to Mr. John Jarrett, RETEK, as a result of a records review which identified several violations of the I&HW rules and areas of concern. Mr. Jarrett was requested to respond in writing by February 1,1 994 with the company's actions to correct the deficiencies and a schedule by which corrective action would be initiated and completed. A response was received on February 1,1 994. The response indicated that the company did not feel that any actions were warranted. A copy of the NOV letter, response letter and associated Inter-office memorandums to the TNRCC Enforcement Screening Committee, I&HW Division are provided as Attachment F.

In August of 1980 OBF filed a Part A hazardous waste permit application with the Texas Department of Waste Resources (TDWR) for the trench collection system and the surface impoundments. A copy of TDWR letter referencing the permit applications is provided as Attachment G. The surface impoundments were regulated as hazardous waste processing/disposal facilities under TDWR and Texas Water Commission (TWC) Solid Waste Registration No. 30897. Copies of OBF's Notice of Registration dated June 14, 1982 and June 13, 1989 are provided at Attachment H.

After a wastewater treatment system was installed in 1982, the facility ceased discharging into the surface impoundments and began discharging treated effluent into the unnamed tributary of Little Sandy Creek. The discharge was regulated under TWC Water Quality Permit No. 02542 and National Pollution Discharge Elimination System (NPDES) Permit No. TX 0089486, issued on April 5, 1982. Metal-Bearing sludge generated by the wastewater treatment system was (1) dewatered with a filter press, (2) accumulated for less than 90 days, and (3) shipped to an approved waste disposal site.

The wastewater conveyance trenches were closed in-place in accordance with a interum status closure plan approved by TDWR on April 26, 1982. The soils within the earthen trenches had elevated concentrations of chromium, copper, nickel and zinc. The plan included the transfer of a portion of the hazardous material within the trenches, excavated prior to the construction of a concrete foundation, to one of the surface impoundments. A building was constructed on top of the trench disposal area. A sketch of the disposal facilities indicating the location of the trenches, building and surface impoundments in provided as Attachment I. The TDWR approved the closure plan with the requirement that the trenches be regulated as a landfill, because not all of the contaminated soil was removed. The surface impoundments were also closed in-place with a closure plan approved by the TDWR on October 19, 1983. Closure certification was provided for the surface impoundments on August 22, 1984.

In 1984, OBF recorded in the Washington county deed records a .459 acre area, identified as the conveyance trenches and a 1.964 acre area, identified as the surface impoundments as hazardous waste disposal sites. Copies of the disposal site deed recordations are attached (Attachment J).

In November 1984, the facility filed an Affidavit of Exclusion (Attachment K) with the TDWR. The Affidavit of exclusion was filed to exempt OBF from submitting a RCRA Part B permit application. The exclusion was not applicable to the hazardous waste management facilities; collection trenches and surface impoundments, addressed in the Part A permit application. On July 31, 1985, the TWC withdrew the request for the RCRA Part B permit application, resulting in OBF being in violation of operating hazardous waste landfills without a permit . The landfills are currently not permitted.

On August 8, 1984 OBF and Chesley Industries, 20775 Chesley Drive, Farmington, Michigan, merged, with Chesley Industries being the surviving Corporation. Hussman Corporation is the Parent corporation of Chesley Industries. Chesley Industries sold the OBF 20 acre site to Recycled Products Corporation on may 18, 1992. Recycled Products Corporation sold the property to Reconversion Technologies of Texas Inc., with the exception of the 1.964 acre tract, being used as a hazardous waste disposal site, on August 1, 1992. Copies of Deed transaction records to the property are provided as Attachment L.

A chronological list of events and documents regarding OBF/RETEK was complied by Ms. Wong and is provided as Attachment M.

<u>Violations</u>:

Based on the facts and information obtained during the June 16, 1994, inspection and on-going investigation of the facility, the following alleged violations of I &HW regulations were noted.

Technical Recommendations

<u>Conclusion</u>

Based on facts and information obtained during the inspection and investigation which revealed that releases of contaminants from the site have impacted a receiving stream and the groundwater, a potential threat to public health exists at the site and in view of significant current and unresolved historical violations documented at this site.

Don Wyrick, EQS

Jim Edwards
Waste Program Manager, R-9

Major 30897
3-10-82

RECEIVED
MAR 12 '82
ENFORCEMENT AND
FIELD OPERATIONS

TEXAS DEPARTMENT OF WATER RESOURCES
Industrial Solid Waste Disposal Compliance Monitoring Inspection

Inspection Cover Sheet (see reverse side for checklist use and general instructions)

Compliant ____ Texas Permit/Reg. No. 30897

Noncompliant xxx (explain by separate memo) EPA I.D. No. TXD048901235

Site Operator Information:

Name of Company: Old Brazos Forge

Company's Address: P. O. Box 140
Brenham, Texas 77833

Site Address: Loop 36 N.W.
Brenham, Texas County: Washington

Type of Industry: manufactures steel wire shelves and display assemblies used in retail store displays.

Indicate below Classes of Waste managed (Hazardous-H, Class I nonhazardous-NH, Class II-II).

Generator H Transporter ____

Treatment H Storage H Disposal ____

Site Information (T.S.D. facilities only)

1. Are facilities located outside the 100 year flood plain area? Yes XX No ____
2. Describe land use within one mile: Primarily industrial with limited residential

Inspection Information:

1. Inspectors Name & Title: Robert J. Bressett, Field Representative Phone No. 713/479-5981
2. Inspection Date: February 10, 1982
3. Inspection Participants: Ed Green, Don Watley, Mickey Walker Phone No. 713/836-5626

Approved: Merton J. Coloton
District Supervisor

Signed: Robert J. Bressett
Inspector

RECEIVED
APR 19 1982
CP/TDWR

Date: MARCH 10, 1982

TDWR- (Changed 2/5/82, Texas Administrative Code Section references added pages 3-13)

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Generators Checklist

Section A - Manifest

1. Does generator dispose of (hazardous and/or non-hazardous) waste on-site only? Hazardous Yes___ No XX; Non-Hazardous Yes___ No___

   a. If yes, do not fill out rest of Sections A and D.

   b. If no, identify primary off-site facility(s). Use comments sheet or add registration waste list properly annotated. see comments

2. Is the generator required to use a TDWR manifest shipping control ticket (Rule 156.22.01.110(a)? see comments Yes XX No___
   *335.10(a) &(b) & 335.64(a),(b), & (c)

   a. If yes, is manifest properly completed? Yes___ No___

   b. If no, explain in comments sheet.

   c. Does the generator receive return (white) copy of shipping control ticket? Yes___ No___

   *d. Is generator a small quantity generator? Yes___ No XX

NOTE: If 2d is yes, over 90-day storage without a permit is allowed.

Section B

1. Does the generator have any closed or abandoned facilities? Yes___ No XX
   see comments

   **a. If yes, explain in comments sheet.

Section C - Hazardous Waste Determination (Rule 156.22.01.106(e) & 156.22.06.002)
*335.6(e) &335.62

1. Does generator generate solid waste(s) listed in Part 261, Subpart D (List of Hazardous Waste)? see attachment Yes XX No___

2. Does generator generate solid waste(s) that exhibit hazardous characteristics? (corrosivity, ignitability, reactivity, EP toxicity) Yes___ No XXX

   a. Does generator determine characteristics by testing or by applying knowledge of processes? Applying knowledge of processes

      (1) If determined by testing, did generator use test methods in Part 261, Subpart C (or equivalent)? Yes___ No___

      (2) If equivalent test methods used, attach copy of equivalent methods used.

TDWR-

ATTACHMENT

* (Changed 2/5/82 Texas Administratibe Code Section reference added)
**(Indicates checklist questions which should be noted or completed at the time of an on-site inspection.)

3. Is notification of waste stream changes current? (Rule 156.22.01.106(c)) *335.6(b) & (c) — Yes___ NoXX

see comments

a. If no, explain in comments sheet.

4. Is any Class I non-hazardous Class II or PCB (storage) solid wastes generated? — Yes___ No XX

a. Did the generator test all wastes to determine non-hazardous characteristics? — Yes___ No XX

(1) If no, list wastes deemed non-hazardous or processes from which non-hazardous waste was produced. (Use xerox of registered material or add to comments sheet.) — see comments

*335.65-.69

Section D - Pre-Transport Requirements (Rule 156.22.06.005-009)

(According to ______________________________)
Name, owner/operator/manager

1. Does owner/operator package waste for shipment? — Yes___ No___ N/A

*a. If yes, complete this section, if no, go on to Section E (however see Notes, pp. 5).

2. Is generator familiar with 49CFR 173, 178 & 179 (DOT) requirements? — Yes___ No___

*3. Does generator appear to have standard procedures for packaging labeling and marking of hazardous waste? — Yes___ No___

*4. Does the generator mark each package in accordance with 49CFR 172? — Yes___ No___

*5. Is each container of 110 gallons or less marked with the following label (49CFR 172-304)? — Yes___ No___

Label saying: HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
Generator's Name and Address ______________________________
Manifest Document Number ______________________________

6. Accumulation Time - (May accumulate hazardous waste for up to 90 days without a permit provided; see Rule 156.22.06.009).

*335.69

a. Is the generator a permitted storage facility? — Yes___ No___

b. Are containers used to temporarily store waste before transport? — Yes___ No___

**(1) If yes, is each container clearly dated? Also, fill out rest of No. 6 (Accumulation Time) — Yes___ No___

ATTACHMENT

* (Changed 2/5/82 Texas Administrative Code Section references added)
**(See note, Page 3)

**(2) Are containers in good condition (check for leaks, corrosion, bulges, open, etc.)? Yes___ No___

(a) If no, explain in comments.

c. Does generator inspect containers for leakage or corrosion at least weekly? (Rule 156.22.15.005)? *335.245 Yes___ No___

(1) If leaking or bulging container is found, does operator transfer waste into a usable container (properly lined not to react with the waste)? Yes___ No___

(2) If no, explain in comments.

d. Does generator handle ignitable or reactive wastes? Yes___ No___

(1) If yes, go on to e.

**e. Does generator locate containers holding ignitable or reactive waste at least 15 meters (50 feet) from the facility's property line (40 CFR 265.176 - Special Requirements for Ignitable or Reactive Wastes and Rule 156.22.15.006)? *335.246 Yes___ No___

**f. Are containers holding incompatible wastes kept apart by physical barrier or sufficient distance? Yes___ No___

(1) If no, explain in comments.

NOTE: If tanks used, fill our checklist for tanks.

NOTE: If generator accumulates waste on-site for less than 90 days, (has no T.S.D. facilities) complete only Section D, F, and G of the Facilities Checklist. Small quantity generators are not subject to Rule 156.22.06.009 (a) (4) which is the basis for these requirements. *335.69(a)(4)

7. Describe drum or container storage area. Use photos and/or comments sheet.

**a. Does the storage area have containment protection provided (40 CFR 264.175--Use and Management of Containers, Containment)? NOTE: This will be a future permit requirement. *335.9 *335.70-.72 Yes___ No___

Section E - Record Keeping and Reports (Rule 156.22.01.109 and 156.22.06.010-.012)

1. Does generator keep the required records and reports for 3 years? Yes XX No___

a. If no, explain in comments sheet.

2. Where are records kept (at facility or elsewhere)? at facility

*(Changed 2/5/82 Texas Administrative Code Section references added)

**(See note, Page 3)

ATTACHMENT

*335.75

Section F - Special Conditions (Rule 156.22.06.015) N/A

1. Has generator received from or transported to a foreign source any hazardous waste? Yes___ No___

   a. If yes, has he filed a notice with the Regional Administrator? (EPA requirement only) Yes___ No___

   b. Is this waste manifested and signed by Foreign consignee? Yes___ No___

   c. If generator transported waste out of the country, has he received confirmation of delivered shipment? Yes___ No___

*335.6(b) & (c)

Section G - Waste Disposition Rule 156.22.01.106(b) and (c))

1. Do the disposal methods described in the registration agree with actual situations? Yes___ No XX

   a. If no, explain in comments sheet or add copy of annotated registration waste list. see comments

**2. Is there any evidence of spills or unauthorized discharges? Yes XX No___

   a. If yes, explain in comments sheet. see comments

*(Changed 2/5/82, Texas Administrative Code Section references added)
**(See note, Page 3)

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Facilities Checklist - Rule 156.22.01.102 and 156.22.08.001-008
*335.2 *335.111-.118

Section A - General Facility Standards

1. Has proof of deed recordation of on-site disposal facilities been provided to the agency? (Rule 156.22.01.105, for hazardous waste see Rule 156.22.13.010) Note: Not required for Waste Disposal Well. *335.5, 335.220 — Yes___ No XX
   a. If no, explain in comments sheet. see comments

**2. Has any evidence of spills or unauthorized discharge(s) been observed/reported (Rule 156.22.01.104)? *335.4 — Yes XX No___
   a. If yes, explain in comments sheet. see comments

3. NOTE: A sketch of facilities, general site orientation showing landfills, surface impoundments, injection wells, drainage routes, water bodies/cources and other pertinent features (Separate sketch or diagrams of landfill(s) etc.) should be attached to this and other facility checklist(s). see attachment

   NOTE: For all non-hazardous and non-commercial facilities do not complete the remainder of this Facilities Checklist. Proceed to specific type facility checklists and complete one checklist for each disposal facility or multi-comments on a single checklist.

4. Has facility received hazardous waste from a foreign source (Rule 156.22.08.003)? *335.113 — Yes___ No___ N/A
   a. If yes, has he filed a notice at least 4 weeks in advance to receipt with the Executive Director and the Reg. Admin.? — Yes___ No___
      (1) If no, explain in comments sheet.

Section B - Waste Analysis - Rule 156.22.08.004
*335.114

1. Does facility have a waste analysis plan? — Yes XX No___
   a. If yes, is it maintained at the facility? — Yes xx No___
   b. Does the waste plan include the following?
      (1) Parameters for which each waste will be analyzed? — Yes xx No___
      (2) Test methods used to test for these parameters? — Yes xx No___
      (3) Sampling method used to obtain sample? — Yes xx No___

ATTACHMENT

*(Changed 2/5/82 Texas Administrative Code Section references added)
**(Note; Indicates checklist questions which should be noted or completed at the time of an on-site inspection.

(4) Frequency with which the initial analysis will be reviewed or repeated? Yes XX No ___

(a) If yes, does it include requirement to repeat whenever wastestream or process(s) is changed? Yes XX No ___

(5) (For off-site facilities) Waste analyses that generators have agreed to supply? Yes ___ No ___

(6) (For off-site facilities) Procedures which are used to inspect and analyze each movement of hazardous waste including:

(a) Procedures to be used to determine the identity of each movement of waste? Yes ___ No ___

(b) Sampling method to be used to obtain representative sample of the waste to be identified? Yes ___ No ___

(c) If the answers to 1, 1a or 1b(1)-(6) is no, explain in comments sheet or attach corrective action letter to facility.

*2. Does the facility provide adequate security through (Rule 156.22.08.005):
*335.115

(a) 24-hour surveillance system? (e.g. television monitoring or guards) Yes ___ No ___

OR

(b) (1) Artificial or natural barrier around facility (e.g. fence or fence and cliff)? Yes XX No ___

Describe Chain link fence with locked gate surrounding facility

(2) Means to control entry through entrances (e.g. attendant, television monitors, locked entrance, controlled roadway access)? Yes xx No ___

Describe entrance to facility is thru plant entrance only, with attendant

*3. Does the facility have a sign with the legend "Danger - Unauthorized Personnel Keep Out" (Rule 156.22.08.005(c) unless exempt under Subsections (a)(1) and (a)(2))? *335.115 YesXXX No ___

a. Unless exempt, if no, explain in comments sheet.

*(See note, Page 7)
(Changed 2/5/82 Texas Administrative Code Section references added)

ATTACHMENT

*335.116

Section C - General Inspection Requirements - Rule 156.22.08.006

1. Does facility have a written inspection schedule (and plan)? Yes xx No___

   (a) If yes, is the schedule maintained at the facility? Yes xx No___

   (b) Does the inspection schedule (plan) provide for inspecting the following:

      (1) Monitoring equipment? Yes xx No___

      (2) Safety and emergency equipment? Yes xx No___

      (3) Security devices? Yes xx No___

      (4) Operating and structural equipment? Yes xx No___

      (5) Does the schedule or plan identify the types of problems to be looked for during inspection:

         (a) Malfunctions and deterioration? Yes xx No___

         (b) Operator error? Yes xx No___

         (c) Discharges or threat of discharges? Yes xx No___

2. Does the owner/operator maintain an inspection log? Yes XX No___

   a. If yes, does it include:

      (1) Date and time of inspection? Yes XX No___

      (2) Name of inspector? Yes XX No___

      (3) Notation of observations? Yes XX No___

      (4) Date and nature of repairs or remedial action? Yes XX No___

   **b. Are there any malfunctions or other deficiencies noted in the inspection log that remain uncorrected? Yes___ No XX

   c. Are the inspection log records maintained for 3 years? Yes XX No___

3. If the answers to 1, 1a, 1b(1)-(5), 2, 2a(1)-(4), or 2c, is no, explain in the comments sheet or attach a copy of the corrective action letter sent to the facility. If for 2b the answer is yes, explain in comments sheet.

* Changed 2/5/82 Texas Administrative Code Section references added)
** (See note, Page 7)

ATTACHMENT

*335.117

Section D - Personnel Training - Rule 156.22.08.007

1. Does the owner/operator maintain Personnel Training Records at the facility? Yes XX No___
   How long are they kept? ______________
   (Current personnel - for the life of site; former employees - for 3 years)

   a. If yes, do they include:

      (1) Job Title and written job description of each position? Yes XX No___

      (2) Description of type and amount of training? Yes XX No___

      (3) Records of training given to facility personnel? Yes XX No___

   b. If the answers to 1, 1a(1)-(3) is no, explain in the comments sheet or attach a copy of the corrective action letter sent to the facility.

Section E - Requirements for Ignitable, Reactive or Incompatible Waste - Rule 156.22.08.008

*335.118

1. Does facility store or dispose of ignitable and/or reactive wastes (if no, go on to Section F)? Yes XX No___

   a. Is the owner/operator familiar with proper separation and safeguards needed to prevent ignition or reaction of ignitable or reactive waste? (Reference - see also Appendix IV of Rule 156.22. 05)

      *335.48

      (1) Use comments sheet to describe separation and confinement procedures.

      (2) Use comments sheet to describe any potential sources of ignition or reaction. N/A

   b. Are smoking and open flame confined to specifically designated locations? Yes XX No___

   **c. Are "No Smoking" signs posted in hazardous areas? Yes XX No___

   d. If answer(s) to 1b or 1c are no, explain in comments sheet.

2. Inspect containers:

   **a. Are containers leaking, bulging, or corroding? Yes___ No___ N/A

   b. If yes, explain in comments sheet.

*(Changed 2/5/82 Texas Administrative Code Section references added)
**(See note, Page 7)

ATTACHMENT

Section P - Preparedness and Prevention - Rule 156.22.09.001-.007

**1. Is there evidence of fire, explosion, or contamination of the environment? Yes xx No___

a. If yes, use comments sheet to explain. see comments

2. Is the facility equipped with:

a. Internal communication or alarm system? Yes XX No___

**(1) Is it easily accessible in case of emergency? Yes XX No___

b. Telephone or two-way radio to call emergency response personnel? Yes XX No___

**c. Portable fire extinguishers, fire control equipment spill control equipment and decontamination equipment? Yes XX No___

(1) Is this equipment tested to assure its proper operation? Yes XX No___

d. Water of adequate volume for hoses, sprinklers or water spray system? Yes___ No___ N/A

(1) Source of Water: ________________

(2) Pumping or delivery rate: ________________

**3. Is there sufficient aisle space to allow unobstructed movement of personnel and equipment? Yes xx No___

4. Has the owner/operator made arrangements with the local authorities to familiarize them with characteristics of the facility? (Layout of facility, properties of hazardous waste handled and associated hazards, places where facility personnel would normally be working, entrances to roads inside facility, possible evacuation routes.) Yes xx No___

5. In the case that more than one police and fire department might respond, is there a designated primary authority? Yes___ No___ N/A

a. If yes, list primary authority ________________

6. Does the owner/operator have phone numbers of and agreements with State emergency response teams, emergency response contractors and equipment suppliers? Yes___ No XX

a. Are they readily available to the emergency coordinator? Yes___ No___ N/A

7. Has the owner/operator arranged to familiarize local hospitals with the properties of hazardous waste handled and types of injuries that could result from fires, explosions, or releases at the facility? Yes XX No___

* (Changed 2/5/82, Texas Administrative Code Section references added)
** (See note Page7)

ATTACHMENT

8. Have State or local authorities declined to enter into arrangements 4-7 above? Yes___ No XX

a. If yes, does the operating record indicate this? Yes___ No N/A

*335.151-.157

Section G - Contingency Plan & Emergency Procedures - Rule 156.22.10.001-.007

1. Is there a contingency plan? Yes___ No XX

   a. If yes, is it maintained at the facility? Yes___ No___
   b. If yes, is it a revised SPCC Plan? Yes___ No___

2. Is there an emergency coordinator on-site or on call at all times? Yes___ No XX

3. If answer is no to any or all of Section F 2-7 and G, explain in comments sheet. see comments

*335.171-.177

Section H - Manifest System, Recordkeeping & Reporting - Rule 156.22.11.001-.007

1. Does facility receive waste from off-site? Yes___ No XX

   a. If yes, does the owner/operator comply with manifest requirements? Yes___ No___
   b. If 1 is no, go on to question 4 below.

2. Does the facility receive any waste from a rail or water (bulk shipment) transport? Yes___ No XX

   a. If yes, is it accompanied by a properly executed shipping paper? Yes___ No___

3. Has the owner/operator received any shipments of waste which were inconsistent with the manifest? Yes___ No XX

   a. If yes, has he attempted to reconcile the discrepancy with the generator and transporter? Yes___ No___

*4. Does the owner/operator keep a written operating record at the facility (Rule 156.22.11.003)? Yes XX No___
*335.173

   a. Does the operating record reflect the following:

      (1) Description, quantity of each hazardous waste received and method(s) and date of T.S.D. at the facility? Yes XX No___
      (2) Location and quantity of each hazardous waste within the facility (for disposal facilities quantity on a mpa or diagram of each cell or disposal area, for all facilities cross-reference to shipping ticket Nos.)? Yes XX No___

*NOTE: This question applies to all Hazardous Waste Generators, including on-site facilities.

*(Changed Texas Administrative Code Section references added)
** (See note, Page 7)

ATTACHMENT

(3) Records and results of waste analyses and trial tests? Yes XX No___

(4) Summary Reports of all incidents that require implementing the contingency plan? Yes___ No___ N/A

(5) Closure cost estimates for all facilities. (Rule 156.22.14.002) *335.232 Yes___ No XX

(6) Post closure cost estimates for disposal facilities. (Rule 156.22.14.003) *335.233 Yes___ No XX

b. If no for Section H, 1-3a, & 4 all, explain in comments sheet. see comments

5. Does the owner/operator maintain a closure plan for all facilities (Rule 156.22.13.001-006)? *335.211-.216 Yes___ No XX

a. If no, explain in comments sheet.

6. Does the owner/operator maintain a post closure plan for disposal facilities (Rule 156.22.13.007-010)? *335.217-.220 Yes___ No XX

a. If no, explain in comments sheet.

7. Do records indicate that the facility received any waste not accompanied by a manifest (Rule 156.22.01.115(a) and (b) (for facilities receiving from off-site only)? *335.15 Yes___ No XX

a. If yes, has he submitted an unmanifested waste report to the Executive Director (Rule 156.22.01.115(c) and 156.22.11.006)? *335.15(c) *335.176 Yes___ No___

(1) If no, explain in comments sheet.

*(Changed 2/5/82, Texas Administrative Code Section references added)

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Surface Impoundments Checklist (Rule 156.22.17.001-008)   Class of Waste (

1. Are surface impoundments presently used to treat or store waste? Yes XX No ___

   a. If yes, inspect the impoundments.

**2. Does the impoundment appear to maintain at least 2 feet (60 cm) of freeboard? Yes XX No ___

**3. Is there evidence of overtopping of the dike? Yes ___ No XX

   a. If yes or if less than 2 feet, explain in comments sheet.

4. Containment system for dyked or dammed impoundments (Rule 156.22.17.003).

   **a. Does the earthen dike have a protective cover (e.g. grass, shale, rock) to minimize wind and water erosion? Yes XX No ___

   b. If no, explain in comments sheet.

5. What wastes are treated or stored in the impoundment? ___

   See attachment

6. Are waste analyses and trial tests conducted on these wastes (chemical processing of a different hazardous waste or method only)? Yes XX No ___

   a. If not, does the owner/operator have written documented information on similar treatment of similar wastes? Yes XX No ___

7. Is this information retained in the operating record? Yes XX No ___

8. Is the impoundment inspected daily to check freeboard level? Yes XX No ___

9. Is the impoundment, dikes and vegetation surrounding the dike inspected weekly to detect leaks, deterioration or failures? Yes XX No ___

ATTACHMENT

**a. Is there any evidence of seepage? Yes___ No XX

(1) If Yes, explain in comments sheet.

10. Does the impoundment have a liner? Yes XX No___

a. If Yes, what type? Bentonite

b. If Yes, does it have a leachate collection and removal system? Yes___ No XX

**11. Is there evidence of ignitable or reactive wastes placed in the impoundment? Yes XX No___

a. If Yes, explain in comments sheet. See comments
or
b. Is the impoundment used solely for emergencies? Yes___ No XX

**12. Is there evidence of incompatible wastes placed in the impoundment? Yes___ No XX

13. Are monitor wells required for this site? (Refer to Rule 156.22.12.001-.005 - Ground Water Monitoring) Yes XX No___

a. Has owner/operator installed, operated and maintained a ground water monitoring system (unless waived) prior to 11/19/81? Yes___ No XX

NOTE 1: Attach Ground Water Monitoring Report if answer to question 13 is yes.
NOTE 2: If the answer is No for Nos. 6a, 7, 9, 9 and No. 13 after 11/19/81, explain in comments sheet. If the answer to No. 12 is yes, explain in comments sheet.

14. Describe impoundment(s) site and indicate plat map, location(s) and designation(s) Also describe each impoundment's dimensions and capacity (acre-feet): ______
See attachment.

**See Note on Page 1

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Tanks Checklist (Rule 156.22.16.001-007) Class of Waste (_

Section A - General

1. Are tanks presently used to treat or store waste? Yes xx No___
   a. If no, do not complete rest of form. see comments
   **b. If yes, check tanks. (Describe type of tank and indicate underground, above ground, or on-ground in comments sheet). Yes ✓ No___
   **c. Is there evidence that incompatible wastes have been placed in the tank? Yes___ No xxx
   (1) If yes, explain in comments sheet.
   **d. Is there evidence of any ruptures, leaks or corrosion of the tank(s)? Yes___ No XXX
   (1) If yes, explain in comments sheet.
2. Are there any uncovered tanks? Yes xx No___
   a. If no, do not complete - e.
   **b. If yes, do they have 2 feet (60 cm) freeboard? Yes___ No xx

   or

   **c. A containment structure? (e.g. dike or trench) Yes xx No___

   or

   **d. A drainage control system? Yes___ No___
   **e. A diversion structure? (e.g. standby tank) (NOTE: The structure in c, d or e must have a capacity that equals or exceeds the volume of the top 2 feet (60 cm) of the tank.) Yes XX No___
3. Are any of the tanks continuous feed? Yes XX No___
   **a. If yes, is it equipped with a means to stop inflow (e.g. waste feed cutoff or bypass to a stand-by tank)? Yes XX No___

Section B - Waste Analysis

1. Is the tank used to store one waste exclusively? Yes___ No XX
   a. If no, what are the different wastes stored in the tank?
   Precipitates of individual stabilization and process streams for removal of copp[e]
   chromium, cyanide complexes, nickel, and zinc.

TDWR
Page 9 of 20 of Group II
(Changed 6/2/81, added 1d and 1d(1))
** Note checklist questions to be noted or completed during on-site inspection

ATTACHMENT

b. Are waste analyses and trial treatment or storage tests done on these different wastes? Yes___ No XX

(1) If no, does he have written, documented information on similar storage or treatment of similar wastes? Yes XX No___

c. Are there records available of these waste analyses in the operating record? Yes___ No XX

Section C - Inspections

1. Do the records indicate the owner/operator inspects, where present, the following at least daily:

a. Discharge control equipment (e.g. waste feed cut-off, by pass and/or drainage system)? Yes XX No___

b. Monitoring equipment (e.g. pressure and temperature gages)? Yes XX No___

c. Level of waste in each uncovered tank? Yes XX No___

2. Do the records indicate the owner/operator inspects the following at least weekly:

a. Construction materials of tanks for corrosion or leaks? Yes XX No___

b. Construction materials of and area surrounding discharge confinement structures for erosion or signs of leakage? Yes XX No___

3. Is there a written inspection schedule (Rule 156.22.08/006)? Yes XX No___

a. If yes, is the schedule kept at the site? Yes XX No___

b. If no for 3 or 3a, explain in the comments sheet.

4. Is there evidence of ignitable wastes placed in tanks? Yes___ No XX

a. If yes, do records indicate that they are treated, rendered, or mixed before or immediately after placement in the tank so it no longer meets the definition of ignitable? or Yes___ No___

**b. Is the waste protected from sources of ignition? Yes___ No___

(1) If yes, use comments sheet to describe separation and confinement procedures.

(2) If no, use comments sheet to describe sources of ignition. or

c. Is the tank used solely for emergencies? Yes___ No___

** See Note on page 9.

ATTACHMENT

5. Is there evidence of reactive wastes placed in tanks? Yes xx No ___

a. If yes, do records indicate that they are treated rendered, or mixed before or immediately after placement in the tank so it no longer meets the definition of reactive? or Yes ___ No xx

**b. Is the waste protected from sources of reaction? Yes xx No ___

(1) If yes, use comments sheet to describe separation and confinement procedures. see comments

(2) If no, use comments sheet to describe sources of reaction. or

c. Is the tank used solely for emergencies? Yes ___ No xx

6. Do the records indicate that incompatible wastes are placed in the same tank? Yes ___ No xx

a. If yes, explain in the comments sheet.

7. If a waste is to be placed in a tank that previously held an incompatible waste do operating records indicate that the tank was washed? Yes ___ No ___ N/A

a. If yes, describe washing procedures. ______________________________

____

b. Describe how it is possible for incompatible waste to be placed in the same tank. ______________________________

____

____

NOTE: If the answer to Section A 2b-e and 3a, Section B 1b(1) and 1c, and Section C 1a-c, 2a, and 2b was no, explain in comments sheet.

8. Describe tank(s) site and indicate plat map location(s) and designation(s). Also describe size and capacity of each tank: ______________________________

See attachment

____

** See note on page 9.

ATTACHMENT

Checklist Tanks
(attach. to correct checkli

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: A-General Paragraph: 1.b.

All tanks are on-ground, P.V.C. liner steel. They are used for pH adjustment of wastewaters to allow precipitation of solids.

SECTION: C-Inspections Paragraph: 5.b.(1)

Waste streams are separated at origin.

SECTION: Paragraph:

Last ATTACHMENT 3-10-82

Table III-I Generated Hazardous Wastes and Management Activities

Verbal Description of Waste	TDWR Sequence Number	TDWR Waste Code Number	EPA Hazard Code	EPA Hazardous Waste No.	Waste Management Activities (Check applicable items) Off-Site Disposal	On-Site Storage[1]	On-Site Processing[2]	On-Site Disposal	Annual Quantity Generated (lbs)	... and Process
Rinse waters from metal plating. T-W-F	1	100610	R,T	F006	X	X	X	X	Unknown*	SIC Unknown
Same as above	NA		R,T	F007	X	X	X	X	*	SIC Unknown
Same as above	NA		R,T	F009	X	X	X	X	*	SIC Unknown
Same as above	NA		T	F014	X	X	X	X	*	SIC Unknown

*NOTE: The above waste is present as solids in water and the quantity will vary, depending upon the concentration of the solid material. All waste is treated by chemical precipitation, with the precipitated solids to be stored and disposed at a Class I disposal facility. Expected total quantity of water to be generated each year shall be 21,684,000 lbs, of which only a small percentage will be considered to be hazardous waste.

[1] "Storage" means the interim containment or control of waste after generation and prior to ultimate disposal.

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a carrier in conveying or transporting solid waste by truck, ship, pipeline, or other means.

-3 Inactive Hazardous Industrial Solid Waste Management Facility Components

Indicate the inactive facility components which were used for storage/processing/disposal of hazardous wastes or mixtures containing any hazardous waste by entering the number of such facility components in the space provided.

<u>There are no "inactive" facility components.</u>

___ Lagoon/Pond (lined)

___ Basin (earthen, above-grade lined)

___ Basin (earthen, above-grade unlined)

___ Basin (earthen, below-grade lined)

___ Basin (earthen, below-grade unlined)

___ Basin (concrete, above-grade lined)

___ Basin (concrete, above-grade unlined)

___ Basin (concrete, below-grade lined)

___ Basin (concrete, below-grade unlined)

___ Basin (other)

___ Pit (lined)

___ Pit (unlined)

___ Incinerator

___ Open Controlled Incineration Area

___ Boiler (energy-producing)

___ Landfill (sanitary)

___ Landfill (surface, open)

___ Landfill (other)

___ Landspreading Area

___ Spray Irrigation Area

___ Flood Irrigation Area

___ Septic Tank/Drain Field

___ Injection Well

___ Tank (surface storage)

___ Tank (sub-surface storage)

___ Tank (surface processing)

___ Tank (sub-surface processing)

___ Tank (other)

___ Drum Storage Area (open)

___ Drum Storage Area (enclosed)

___ Drum Storage Area (other)

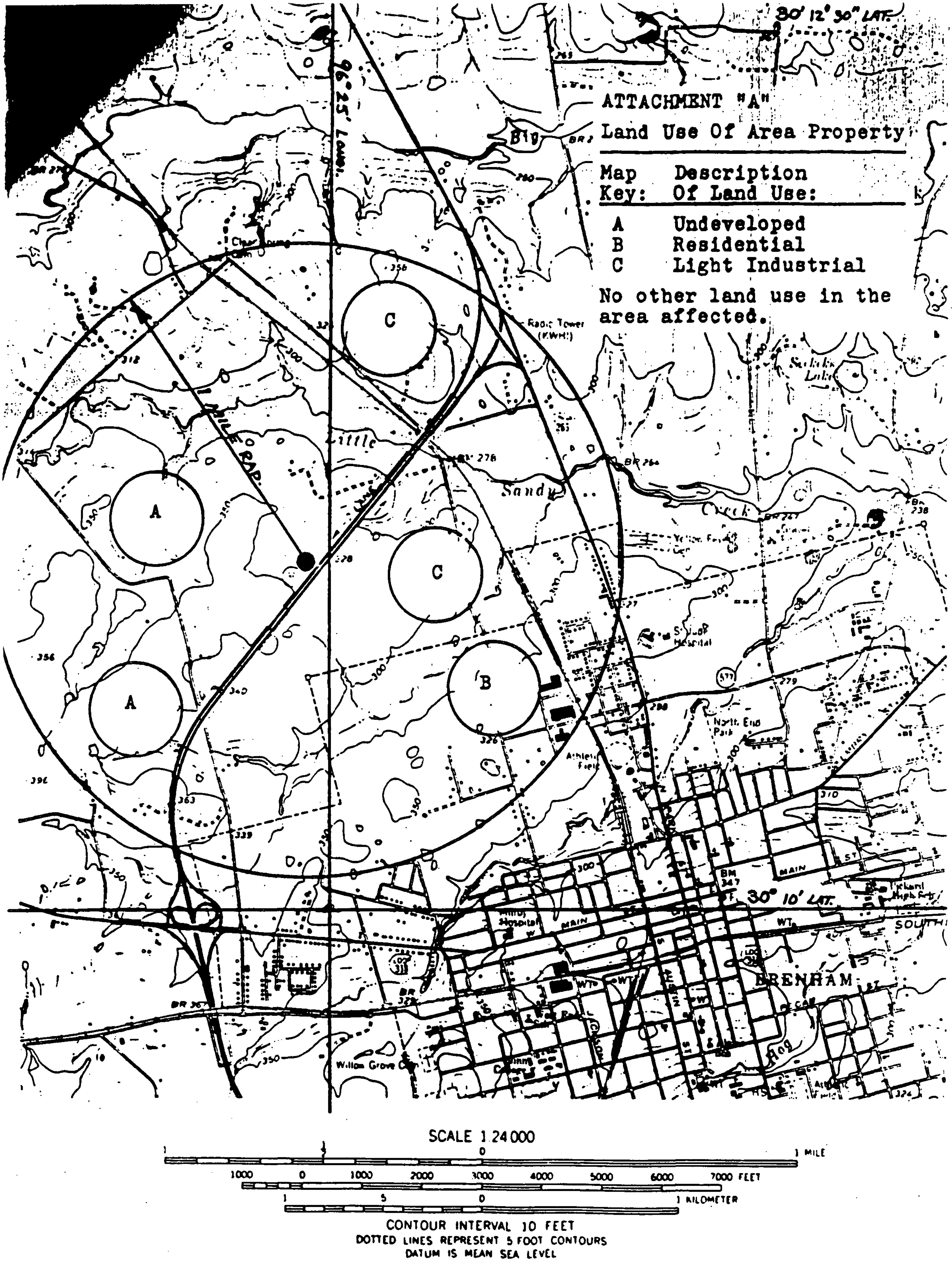
___ Bulk Storage Area (open)

___ Bulk Storage Area (enclosed)

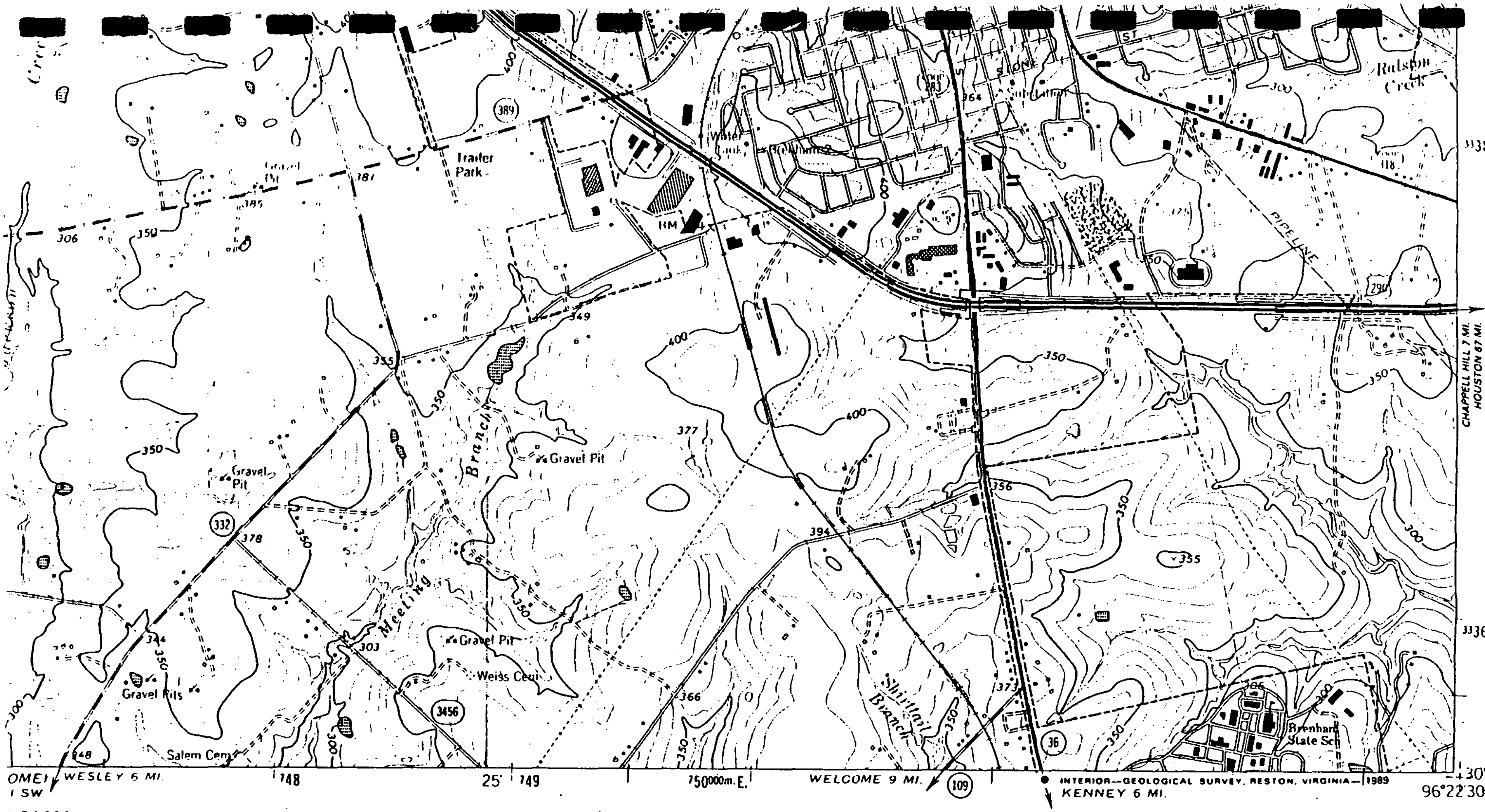
___ Bulk Storage Area (other)

___ Other (specify ___________

___________________________)



ATTACHMENT "A"
Land Use Of Area Property
Map Key: Description Of Land Use:
A Undeveloped
B Residential
C Light Industrial
No other land use in the area affected.
30° 12' 30" LAT.
96°25' LONG.
Big
Little
Sandy
Creek
Radio Tower (KWHI)
North End Park
Athletic Field
Hospital
MAIN
30° 10' LAT.
BRENHAM
Willow Grove Cem
SCALE 1:24 000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5 FOOT CONTOURS
DATUM IS MEAN SEA LEVEL



(KENNEY)
6744 III SE

1:24 000

0 1 MILE

000 4000 5000 6000 7000 FEET

0 1 KILOMETER

RVAL 10 FEET
ENT 5 FOOT CONTOURS
RTICAL DATUM OF 1929

ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt
U.S. Route	State Route

TEXAS

QUADRANGLE LOCATION

3096-123

NAL MAP ACCURACY STANDARDS
R, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND SYMBOLS IS AVAILABLE ON REQUEST

BRENHAM, TEX.
30096-B4-TF-024

1963
PHOTOREVISED 1989
DMA 6744 III NW–SERIES V882

82313

ERN copy

Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Peggy Newberry, I & HW Liason Date: 12-19-95
Field Operations Division

Thru: J. Mac Vilas, Supervisor JMV
I & HW Team I, Waste Section
Enforcement Division

From: Connie Wong, Enforcement Coordinator
I & HW Team I, Waste Section, Enforcement Division

Subject: Reconversion Technologies of Texas (RETEK)
Former Old Brazos Forge Site
1709 Highway 36 Northwest, Brenham, Texas 77833
TNRCC Solid Waste Registration Nos. 82313 and 30897
EPA I.D. No. TXD048901235

I. INTRODUCTION

On November 15, 1995, J. Mac Vilas and Connie Wong of the Enforcement Division conducted an inspection of the above noted facility and sampled four residential water wells located approximately one half mile downgradient of the 20 acre site. The facility was bought by RETEK in December, 1992 from Recycled Products and was shut down on/about May of 1995. The facility was originally owned by the Hussman Corporation which operated the former Old Brazos Forge Company at this site. Finished metal products were produced including food display racks. RETEK, along with Hussman Corporation and Recycled Products, were issued a Notice of Petition and Executive Director's Report by TNRCC on November 3, 1994 which alleged violations of the Texas Administrative Code, Title 30 and the Code of Federal Regulations, Title 40. Many of the violations and areas of concern relate to the three (3) former surface impoundments and earthen trenches that were used to manage industrial and hazardous wastewater and sludges (EPA listed waste F006, F007, F009 and F019). The surface impoundments and trenches were closed as hazardous waste landfills, measuring 1.964 acres and 0.459 acre, in August 1984 and July 1982, respectively. This memorandum documents new violations, continuing violations and areas of concern observed during the inspection.

II. VIOLATIONS

A. NEW VIOLATIONS

1. <u>30 TAC §335.112(a)(6) - Standards, incoporating; 40 CFR §265.117(b)(1) - Security</u>

This regulation states that the Regional Administrator may require, at partial and final closure, continuation of any of the security requirements of §265.14 during part or all of the post-closure care when access by the public may pose a hazard to human health. The security requirements in 40 CFR §265.14(b) states that a sign with the legend, "Danger - Unauthorized Personnel Keep Out," must be posted at each entrance to the active portion of the facility and at other locations in sufficient numbers to be seen from any approach to this active portion.

The former surface impoundments, closed as a hazardous waste landfill, did not have signs with the required legend in sufficient numbers and places to be seen from any approach (see Attachment F, Photographs #6, 7, 8, 9, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34). High vegetation also impeded viewing of the signs.

2. <u>30 TAC §335.4 - General Prohibitions and Texas Water Code §26.121 - Unauthorized Discharge Prohibited</u>

Section §335.4 of 30 TAC states that no person may cause, suffer, allow or permit the collection, handling, storage, processing or disposal of industrial solid waste in such a manner so as to cause: (1) the discharge or imminent threat of discharge of such waste into or adjacent to waters in the State without obtaining specific authorization for such a discharge from the TNRCC; (2) the creation or maintenance of a nuisance; or (3) the endangerment of the public health and welfare.

In addition, Section §26.121 of the Texas Water Code states that no person may engage in any activity which would cause pollution of waters in the State.

On September 28, 1995, TNRCC sampled four residential water wells within one half mile and downgradient of the facility (see Attachment A and Attachment F, Photographs #35 - 48). The results indicated that two wells were contaminated with hexavalent chromium (see Attachment B). These two wells also had total chromium above the EPA Drinking Water Standard.

On November 15, 1995, TNRCC re-sampled the four wells. The November 15, 1995 sample results also indicated that the same two wells were contaminated with hexavalent chromium and one of these wells exceeded the EPA Drinking Water Standard for total chromium (see Attachment C). Three of the four sampled wells are currently used as drinking water sources for the residents. The owner of the other well (Blum well) has been purchasing and drinking bottled water since the January 1993 TNRCC sampling and discovery of hexavalent chromium in their well. A survey of the area by TNRCC personnel revealed that there are approximately 15 homes in the area of the contaminated wells and a number of trailer homes adjacent to the closed hazardous waste landfill at the facility (see Attachment D).

Hexavalent chromium, commonly used in metal plating operations, is not naturally occurring in ground water. In a previous sampling event TNRCC conducted on January 5, 1993, groundwater samples from the facility's monitor wells indicated that there was chromium in concentrations above the Drinking Water Standard in two downgradient wells (MH-5 and MH-12) and hexavalent chromium in one downgradient well (MH-12). There are no other known industrial sources of chromium and hexavalent chromium near the contaminated residential wells or between the contaminated wells and the facility. In addition, the concentration of hexavalent chromium has increased from 70 to 88 micrograms/liter and the total chromium concentration has increased three fold from 0.05 to 0.15 milligrams/liter in one of the residential wells (Blum well) located downgradient and closest to the facility from January 1993 to November 1995.

3. <u>30 TAC §335.112(a)(5) - Standards, incorporating; 40 CFR §265.90(b) - Ground-Water Monitoring</u>

The owner or operator must install, operate and maintain a ground-water monitoring system which complies with §265.91 - §265.94. The ground-water monitoring program must be carried out during the active life of the facility, and for disposal facilities, during the post-closure period as well.

On November 15, 1995, TNRCC personnel noted a number of items that indicated the groundwater monitoring system is not being maintained, including the fact that the wells were inaccessible due to overgrown vegetation. In addition, it is evident that the required groundwater sampling at the closed hazardous waste landfill is not being conducted, since the wells at the facility are inaccessible, and since the TNRCC files indicate that the last ground-water sampling report filed by the facility was dated October 29, 1994. Without sampling of the monitor wells, the concentrations of chromium and other hazardous waste constituents already present in ground water cannot be monitored.

4. <u>30 TAC §335.112(a)(6) - Standards, incorporating; 40 CFR §265.228(a)(2)(iii) - Post Closure Care for a Surface Impoundment</u>

At closure, the owner or operator must provide post-closure care for a landfill, including the following: cover the surface impoundment with a final cover designed and constructed to provide long-term minimization of the migration of liquids through the closed impoundment and promote drainage and minimize erosion of the cover.

On November 15, 1995, TNRCC personnel noted that the landfill cover was overgrown with vegetation over 6 feet in height (see Attachment F, Photographs #6, 7, 8, 9, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34). In addition, the soil and vegetation near the landfill appeared to be dry. The tall vegetation does not promote drainage of the cover and the dry vegetation and soil does not indicate that it has been watered to prevent cracking of the landfill cover. A breach in the integrity of the landfill cover may result in exposure of hazardous waste to the ground water, soil or air.

5. 30 TAC §335.112(a)(6) - Standards, incorporating; 40 CFR §265.228(b)(3) - Post-Closure Care of a Ground-Water Monitoring System

During the post-closure care period, the owner/operator of a surface impoundment in which wastes remain after closure must maintain and monitor the ground-water monitoring system.

On November 15, 1995, TNRCC personnel noted the following items indicating the ground-water monitoring system is not being maintained. The outercasing to well MH-12 was damaged (see Attachment F, Photograph #2); this may allow surface contamination to enter at the well head. Well MH-10 was unlocked (see Attachment F, Photograph #3), allowing access by unauthorized persons to the well. The grass and vegetation in and around the landfill was over six feet tall, making monitor wells MH-2, MH-6, MH-9 and MH-15 inaccessible for sampling (see Attachment F, Photographs #6-9, and #24-34). The concentration of chromium and other hazardous waste constituents in ground water could not be monitored if the wells are not sampled. Well MH-3 had a bent bumper pole (see Attachment F, Photographs #4, 5).

6. 30 TAC §335.112(a)(6) - Standards, incorporating; 40 CFR §265.118(d)(1) - Post Closure Care Plan Amendment

This regulation states that the owner or operator must amend the post-closure plan whenever events which occur during the active life of the facility, including final closures, affect the post-closure plan.

The facility was closed in May 1995 and TNRCC has still not received any amendment to the post-closure care plan. Lack of a post-closure care plan amendment and implementation thereof may result in an undetected release of hazardous waste to the ground water, soil or air.

B. CONTINUING VIOLATIONS

1. 30 TAC §335.112(a)(7) - Standards, incorporating; 40 CFR §265.145 - Post-Closure Financial Assurance

An owner or operator of a facility with a hazardous waste disposal unit must establish financial assurance for post-closure care of the disposal units.

On November 30, 1995, the TNRCC Financial Assurance Section noted that the property owners, RETEK and Recycled Products, have not posted financial assurance since June 1992 for the maintenance of the landfill and the groundwater monitoring system. TNRCC is currently holding a letter of credit issued by The Boatmen's National Bank [Letter of Credit No. S703118, Amendment 005] dated May 12, 1995 from Hussman Corporation for financial assurance for the hazardous waste landfills. This violation was previously noted in the TNRCC Executive Director's Report dated November 3, 1994.

2. <u>30 TAC §335.116(b)/40 CFR §265.91(a)(2) - Ground-Water Monitoring System</u>

A ground-water monitoring system must be capable of yielding ground-water samples for analysis and must consist of monitoring wells (at least three) installed hydraulically downgradient at the limit of the waste management area. Their numbers, locations and depths must ensure that they immediately detect any statistically significant amounts of hazardous waste or hazardous waste constituents that migrate from the waste management area to the uppermost aquifer.

The ground water directly downgradient from the southern end of the 1.964 acres landfill and 0.459 acre landfill area is not being monitored (see Attachment E). Well MH-10 is downgradient from this area; however, it alone is not sufficient to monitor all the ground water downgradient from the southern area of the landfill. The flow path from the southern area, as determined from water contour maps dated 1985 through 1995, is towards the southwest of MH-10. Additionally, MH-10 is not at the limit of the waste management area. According to the water contour maps in Attachment D, well MH-6 is not a downgradient well; therefore, the waste management area is being monitored by only two downgradient wells at the limit of the waste management area. This violation was previously noted in the TNRCC Executive Director's Report dated November 3, 1994.

3. <u>30 TAC §335.2(i)/40 CFR §270.1(c) - Permit Required</u>

Owners and operators of surface impoundments, landfills, land treatment units and waste pile units that received wastes after July 25, 1982, or that certified closure after January 26, 1983, must have post-closure permits, unless they demonstrate closure by removal.

Two hazardous waste landfills, 0.459 acre and 1.964 acres in size, were closed at the facility in July 1982 and August 1984, respectively. The 1.964 acre landfill is subject to post-closure permitting, while both landfills are subject to post-closure care under 40 CFR 265. An affidavit for exclusion from permitting based on accumulation time limit and wastewater treatment system exemption was filed in November

1984 and was approved by TNRCC on July 31, 1985. However, this affidavit failed to demonstrate that the closed, 1.964 acre hazardous waste landfill met any permit exemptions, including accumulation time storage requirements and the definition of a wastewater treatment system tank. Thus, the affidavit was approved on inaccurate information provided by the facility. In June 1992, the ownership of the facility transferred from Hussman Corporation to Recycled Products, thus terminating the exclusion from permitting based on the affidavit. In December 1992, Reconversion Technologies of Texas (RETEK) purchased approximately 18 acres of the property, excluding the 1.964 acre landfill, but including the buildings and the 0.459 acre landfill. TNRCC notified Hussman Corporation by letter dated February 1, 1989 that a post-closure care permit would be required for the 1.964 acre landfill and the facility has not obtained a post-closure care permit since then. This violation was previously noted in the TNRCC Executive Director's Report dated November 3, 1994.

III. AREAS OF CONCERN

1. On November 15, 1995, TNRCC personnel noted that the barbed wire fence around the facility was in disrepair at the south end of the building, allowing entrance of unauthorized persons onto the facility grounds.

2. On November 15, 1995, TNRCC personnel noted that there were abandoned plastic materials in various stages of processing stored in a haphazard manner about the facility yard. In particular, TNRCC noted that there were piles of plastic (see Attachment F, Photographs #13, 14, 15, 17, 18, 19, 20, 21), wooden pallets (see Attachment F, Photographs #13, 20, 21), and drums of unknown contents by well MH-3 (see Attachment F, Photographs #4, 5) and on the south end and back of the building (see Attachment F, Photographs #14, 18, 21).

The photographs and associated maps are included as attachments to this report. This information is submitted as file information.

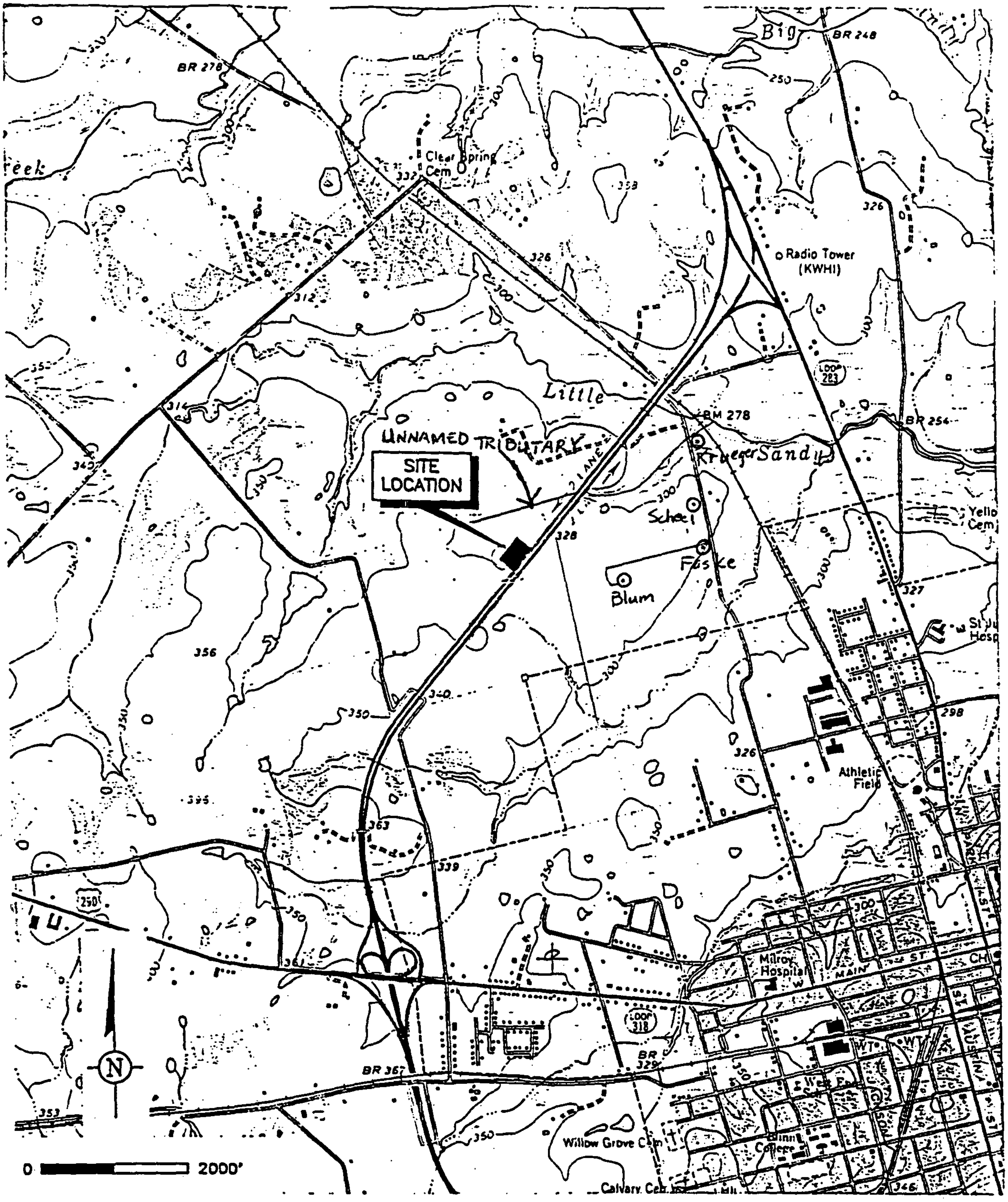
Signed: Connie Wong
Connie Wong, Enforcement Coordinator

cc: Don Wyrick, TNRCC Region 9 - Waco

Attachments A - F

TABLE OF CONTENTS FOR ATTACHMENTS
TNRCC Case Development Inspection 11-15-95

ATTACHMENT A



DRAFTER:
APPROVED:
CHECKED:
DRAWING:
PRJCT NO.: CC0195.001 FILE NO.:
DWG DATE:

ATTACHMENT A CASE DEVELOPMENT INSPECTION (C.D.I.) 11-15-95	RETEK / OLD BRAZOS FORGE S.W.R. Nos. 82313 and 30897 MAP OF DRINKING WATER WELLS – BRENHAM, TEXAS

Attachment B

THE POWER TO MAKE A DIFFERENCE.

SUPPLEMENT TO FINAL ANALYSIS REPORT

REVISED
LAB ID: 9603171
FACILITY: TNRCCFOD
ACCT NO: TNRCCFOD
LCRA

SAMPLE TYPE: Water

ORIGINAL DATE REPORTED: 10/31/95
REVISION DATE REPORTED: 11/15/95
DATE RECEIVED: 09/28/95
SAMPLE DATE: 09/28/95
SAMPLE TIME: 1215
DEPTH:

LOCATION ID: HM 06633

Faske

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Arsenic, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Arsenic, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Barium, Dissolved	0.24	mg/L	EPA200.7	0.01	10/09/95
Barium, Total	0.21	mg/L	EPA200.7	0.01	10/18/95
Cadmium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Cadmium, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Chromium, Dissolved	0.01	mg/L	EPA200.7	0.01	10/09/95
Chromium, ICPMS	27.2	ug/L	EPA200.8	1.0	11/15/95
Chromium, Total	0.12	mg/L	EPA200.7	0.01	10/18/95
Copper, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Copper, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Cyanide, Total	<0.020	mg/L	EPA335.2	0.001	10/11/95
Hexavalent chromium	0.01	mg/l	EPA7196	0.01	09/28/95
Lead, Dissolved	0.07	mg/L	EPA200.7	0.05	10/09/95
Lead, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Manganese, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Manganese, Total	0.01	mg/L	EPA200.7	0.01	10/18/95
Mercury, Diss.-AA	<0.2	ug/L	EPA245.1	0.2	10/13/95
Mercury, Total-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Nickel, Dissolved	<0.02	mg/L	EPA200.7	0.02	10/09/95
Nickel, Total	<0.02	mg/L	EPA200.7	0.02	10/26/95
Selenium, Dissolved	0.09	mg/L	EPA200.7	0.05	10/09/95
Selenium, ICPMS	<4.0	ug/L	EPA200.8	4.0	11/15/95
Selenium, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Silver, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Silver, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Total Hardness	231	mg/L	SM2340B	1	10/18/95
Zinc, Dissolved	0.13	mg/L	EPA200.7	0.01	10/09/95
Zinc, Total	0.12	mg/L	EPA200.7	0.01	10/18/95

Roland Garcia for
?UCK HENDERSON
LABORATORY MANAGER

QA APPROVED

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P.O. BOX 220 AUSTIN, TX 78767-0220 (512) 473-3200 (512) 473-3298 FAX

THE POWER TO MAKE A DIFFERENCE.

SUPPLEMENT TO FINAL ANALYSIS REPORT

REVISED
LAB ID: 9603170
FACILITY: TNRCCFOD
ACCT NO: TNRCCFOD
LCRA

SAMPLE TYPE: Water

ORIGINAL DATE REPORTED: 10/31/
REVISION DATE REPORTED: 11/15/
DATE RECEIVED: 09/28/
SAMPLE DATE: 09/28/
SAMPLE TIME: 1140
DEPTH:

Blum

LOCATION ID: HM 06644

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Arsenic, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Arsenic, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Barium, Dissolved	0.31	mg/L	EPA200.7	0.01	10/09/95
Barium, Total	0.28	mg/L	EPA200.7	0.01	10/18/95
Cadmium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Cadmium, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Chromium, Dissolved	0.11	mg/L	EPA200.7	0.01	10/09/95
Chromium, ICPMS	107.8	ug/L	EPA200.8	1.0	11/15/95
Chromium, Total	0.11	mg/L	EPA200.7	0.01	10/18/95
Copper, Dissolved	0.01	mg/L	EPA200.7	0.01	10/09/95
Copper, Total	0.02	mg/L	EPA200.7	0.01	10/18/95
Cyanide, Total	<0.020	mg/L	EPA335.2	0.001	10/11/95
Hexavalent chromium	0.07	mg/l	EPA7196	0.01	09/28/95
Lead, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Lead, Total	0.07	mg/L	EPA200.7	0.05	10/18/95
Manganese, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Manganese, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Mercury, Diss.-AA	<0.2	ug/L	EPA245.1	0.2	10/13/95
Mercury, Total-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Nickel, Dissolved	<0.02	mg/L	EPA200.7	0.02	10/09/95
Nickel, Total	<0.02	mg/L	EPA200.7	0.02	10/26/95
Selenium, Dissolved	0.11	mg/L	EPA200.7	0.05	10/09/95
Selenium, ICPMS	5.0	ug/L	EPA200.8	4.0	11/15/95
Selenium, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Silver, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Silver, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Total Hardness	327	mg/L	SM2340B	1	10/18/95
Zinc, Dissolved	0.78	mg/L	EPA200.7	0.01	10/09/95
Zinc, Total	0.70	mg/L	EPA200.7	0.01	10/18/95

Roland Garcia for
BUCK HENDERSON
LABORATORY MANAGER

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LCRA

THE POWER TO MAKE A DIFFERENCE.

SUPPLEMENT TO FINAL ANALYSIS REPORT

REVISED
LAB ID: 9603168
FACILITY: TNRCCFOD
ACCT NO: TNRCCFOD
LCRA

SAMPLE TYPE: Water

ORIGINAL DATE REPORTED: 10/31/9
REVISION DATE REPORTED: 11/15/9
DATE RECEIVED: 09/28/9
SAMPLE DATE: 09/28/9
SAMPLE TIME: 0915
DEPTH:

LOCATION ID: HM 06631   Krueger

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Arsenic, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Arsenic, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Barium, Dissolved	0.30	mg/L	EPA200.7	0.01	10/09/95
Barium, Total	0.28	mg/L	EPA200.7	0.01	10/18/95
Cadmium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Cadmium, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Chromium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Chromium, ICPMS	17.1	ug/L	EPA200.8	1.0	11/15/95
Chromium, Total	0.02	mg/L	EPA200.7	0.01	10/18/95
Copper, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Copper, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Cyanide, Total	<0.020	mg/L	EPA335.2	0.001	10/11/95
Hexavalent chromium	<0.01	mg/l	EPA7196	0.01	09/28/95
Lead, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Lead, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Manganese, Dissolved	0.02	mg/L	EPA200.7	0.01	10/09/95
Manganese, Total	0.02	mg/L	EPA200.7	0.01	10/18/95
Mercury, Diss.-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Mercury, Total-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Nickel, Dissolved	<0.02	mg/L	EPA200.7	0.02	10/09/95
Nickel, Total	<0.02	mg/L	EPA200.7	0.02	10/26/95
Selenium, Dissolved	0.10	mg/L	EPA200.7	0.05	10/09/95
Selenium, ICPMS	<4.0	ug/L	EPA200.8	4.0	11/15/95
Selenium, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Silver, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Silver, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Total Hardness	258	mg/L	SM2340B	1	10/18/95
Zinc, Dissolved	0.40	mg/L	EPA200.7	0.01	10/09/95
Zinc, Total	0.37	mg/L	EPA200.7	0.01	10/18/95

Roland Garcia for
BUCK HENDERSON
LABORATORY MANAGER

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THE POWER TO MAKE A DIFFERENCE.

SUPPLEMENT TO FINAL ANALYSIS REPORT

REVISED
LAB ID: 9603169 SAMPLE TYPE: Water
FACILITY: TNRCCFOD
ACCT NO: TNRCCFOD
LCRA

ORIGINAL DATE REPORTED: 10/31/9
REVISION DATE REPORTED: 11/15/9
DATE RECEIVED: 09/28/9
SAMPLE DATE: 09/28/9
SAMPLE TIME: 1030
DEPTH:

LOCATION ID: HM 06632 Scheel

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Arsenic, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Arsenic, Total	0.05	mg/L	EPA200.7	0.05	10/18/95
Barium, Dissolved	0.14	mg/L	EPA200.7	0.01	10/09/95
Barium, Total	0.12	mg/L	EPA200.7	0.01	10/18/95
Cadmium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Cadmium, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Chromium, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Chromium, ICPMS	20.9	ug/L	EPA200.8	1.0	11/15/95
Chromium, Total	0.01	mg/L	EPA200.7	0.01	10/18/95
Copper, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Copper, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Cyanide, Total	<0.020	mg/L	EPA335.2	0.001	10/11/95
Hexavalent chromium	<0.01	mg/l	EPA7196	0.01	09/28/95
Lead, Dissolved	<0.05	mg/L	EPA200.7	0.05	10/09/95
Lead, Total	0.07	mg/L	EPA200.7	0.05	10/18/95
Manganese, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Manganese, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Mercury, Diss.-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Mercury, Total-AA	<0.2	ug/L	EPA245.1	0.2	10/04/95
Nickel, Dissolved	<0.02	mg/L	EPA200.7	0.02	10/09/95
Nickel, Total	<0.02	mg/L	EPA200.7	0.02	10/26/95
Selenium, Dissolved	0.12	mg/L	EPA200.7	0.05	10/09/95
Selenium, ICPMS	<4.0	ug/L	EPA200.8	4.0	11/15/95
Selenium, Total	<0.05	mg/L	EPA200.7	0.05	10/18/95
Silver, Dissolved	<0.01	mg/L	EPA200.7	0.01	10/09/95
Silver, Total	<0.01	mg/L	EPA200.7	0.01	10/18/95
Total Hardness	290	mg/L	SM2340B	1	10/18/95
Zinc, Dissolved	0.17	mg/L	EPA200.7	0.01	10/09/95
Zinc, Total	0.16	mg/L	EPA200.7	0.01	10/18/95

Roland Garcia for
BUCK HENDERSON
LABORATORY MANAGER

QA APPROVED

The mission of the Lower Colorado River Authority (LCRA) is to provide reliable, low-cost utility and public services in partnership with our customers and communities and to use our leadership role and environmental authority to ensure the protection and constructive use of the area's natural resources. The LCRA is a Texas conservation and reclamation district operating with no taxing authority.

P.O. BOX 220 AUSTIN, TX 78767-0220 (512) 473-3200 (512) 473-3298 FAX

THE POWER TO MAKE A DIFFERENCE.

QUALITY CONTROL DATA REPORT

REPORT DATE: 11/13/95

% SPIKE RECOVERY

SAMPLE ID	As	Ba	Cd	Cr	Cu	Pb	Hg-AA	Mn	Ni	Se	Ag	Zn
9603168-71 Dis.	107.3	98.9	107.8	107.7	98.5	104.5	95.2	105.4	105.7	120.6	88.1	108.2
9603168-71 Total	100.3	93.3	98.2	96.6	100.2	92.4		94.8	100.4	94.8	100.9	99.3
9603173-76 Dis.	107.0	101.8	107.9	106.9	104.3	109.2	96.6	108.3	107.7	105.9	108.5	110.7
UPPER LIMIT	130	130	130	130	130	130	130	130	130	130	130	130
LOWER LIMIT	70	70	70	70	70	70	70	70	70	70	70	70

RELATIVE % DEVIATION

SAMPLE ID	As	Ba	Cd	Cr	Cu	Pb	Mn	Ni	Se	Ag	Zn	Hg-AA
9603168-71 Dis.	0.3	0.0	3.0	1.3	0.0	1.7	0.8	0.8	0.1	0.0	1.5	0.2
9603168-71 Total	0.1	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1	0.7	0.0	
9603173-76 Dis.	2.8	0.0	1.7	1.8	1.5	3.4	1.7	1.6	2.2	1.4	1.6	0.2
UPPER LIMIT	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15
LOWER LIMIT	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15

% STANDARD RECOVERY

SAMPLE ID	As	Ba	Cd	Cr	Cu	Pb	Mn	Ni	Se	Ag	Zn	Hg-AA	Fe
9603168-71 Dis.	103.6	100.5	105.7	106.0	101.1	104.9	105.1	104.2	103.3	104.1	106.8	96.4	
9603168-71 Total	99.4	93.6	102.4	101.1	94.0	99.2	99.4	105.9	99.2	98.7	101.4		99.2
9603173-76 Dis.	105.3	101.3	106.7	107.2	101.9	107.0	106.0	105.3	104.6	104.8	107.6	98.2	
UPPER LIMIT	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
LOWER LIMIT	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0

Roland Garcia

QA APPROVED

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TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06631 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name BETEK Point of Collection Krueger water well

Method of Flow Measurement N/A

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. STAMP
1–9	10–12	13	14 15	16 17	18 19	20
			0 9	2 8	9 5	U

Chlorine Contact Time N/A

Date Shipped hand delivered 9/28/95

Collector's Signature Don Wojcik

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)	0 0 0 5 6	Water Temperature (°F)	0 0 0 1 1	pH	0 0 4 0 0
D.O. (mg/l)	0 0 3 0 0	Turbidity (JTU)	0 0 0 7 0		

TEXAS WATER COMMISSION

No. HM 06631 District 9 Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste water well

Grab ✓ Composite Hr.

Method of Preservation HNO_3, Ice

Observations

Auxillary Tags AT040367, AT040368, AT040369, + AT040370

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic		Barium			
Cadmium		Chromium		Copper	
Lead		Manganese		Mercury	
Nickel		Selenium		Silver	
Zinc					

TEXAS WATER COMMISSION

DISTRICT 9

No. HM 06631

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040368 Corresponds to HM 06631

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95 hand delivered

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10-20-84)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040367 Corresponds to HM 06631

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95 hand delivered

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10-20-84)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040369 Corresponds to HM 06631

Lab No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped [illegible]

Method of Conveyance [illegible]

Certification (Sig.) [illegible]

TWC 0169 (Rev. 10-20-94)

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06632 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name BETEK Point of Collection School's water well.

Method of Flow Measurement N/A

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	NAT. STAMP
1 — 9	10 — 12	13	14 15	16 17	18 19	20
			0 9	28	9 5	W

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
0 0 0 5 6		0 0 0 1 1		0 0 4 0 0	
D.O. (mg/l)		Turbidity (JTU)			
0 0 3 0 0		0 0 0 7 0			

TEXAS WATER COMMISSION

No. HM 06632 District 9 Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste water well

Method of Preservation HNO_3, Ice

Auxillary Tags AT040304, AT040305, AT040306, ~~[illegible]~~

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic		Barium			
Cadmium		Chromium		Copper	
Lead		Manganese		Mercury	
Nickel		Selenium		Silver	
Zinc					

TEXAS WATER COMMISSION

DISTRICT 9

No. HM 06632

TWC 0287

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040306 Corresponds to HM 06632

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95 hand delivered

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10 20 94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040304 Corresponds to HM06632

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95 hand delivered

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wejrich

TWC 0169 (Rev. 10-20-94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040305 Corresponds to HM06632

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed DW 9/28/95 Date Shipped 9/28/95 hand delivered

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wejrich

TWC 0169 (Rev. 10-20-94)

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06633 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name RETEK Point of Collection Faske water well

Method of Flow Measurement N/A

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT. STAND (20)
			09	28	95	W

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		C0400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS WATER COMMISSION

No. HM 06633 District 9 Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste Water Well

Method of Preservation HNO3, Ice

Observations

Auxillary Tags AT040363, AT040364, AT040365, & AT040366

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic		Barium			
Cadmium		Chromium		Copper	
Lead		Manganese		Mercury	
Nickel		Selenium		Silver	
Zinc					

TEXAS WATER COMMISSION DISTRICT 9 No. HM 06633

TWC-0237

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040364 Corresponds to HM 06633

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10 20 94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040365 Corresponds to HM 06633

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10 20 94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040363 Corresponds to HM06633

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0163 (Rev. 10 20 94)

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06634 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name RETEK Point of Collection Blum water

Method of Flow Measurement N/A well — QA Blank

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT. STAMP (20)
			09	25	95	W

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)	0 0 0 5 6	Water Temperature (°F)	0 0 0 1 1	pH	0 0 4 0 0
D.O. (mg/l)	0 0 3 0 0	Turbidity (JTU)	0 0 0 7 0		

TEXAS WATER COMMISSION

No. HM 06634 District Lab. Used Lab. No.

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste

Method of Preservation HNO_3, Ice

Observations Field Filtered Total Dissolved Metals

Auxillary Tags

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic	Dissolved	Barium	"		
Cadmium	"	Chromium	"	Copper	"
Lead	"	Manganese	"	Mercury	"
Nickel	"	Selenium	"	Silver	"
Zinc	"	(Total Dissolved Metals)			

TEXAS WATER COMMISSION

DISTRICT 9

No. HM 06634

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06641 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge

Time Collected

Plant Name RETEK

Point of Collection Krueger water well — QA Blank

Method of Flow Measurement N/A

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT STAMP
1 … 9	10 … 12	13	14 15	16 17	18 19	20
			07	25	95	W

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
0 0 0 5 6		0 0 0 1 1		0 0 4 0 0	
D.O. (mg/l)		Turbidity (JTU)			
0 0 3 C 0		0 C 0 7 0			

TEXAS WATER COMMISSION

No. HM 06641 District 9 Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Grab ✓ Composite 0 Hr.

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste

Method of Preservation

Observations Field Filtered Total Dissolved Metals

Auxiliary Tags

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic	Dissolved	Barium	"		
Cadmium	"	Chromium	"	Copper	"
Lead	"	Manganese	"	Mercury	"
Nickel	"	Selenium	"	Silver	"
Zinc	"	(Total Dissolved Metals)			

TEXAS WATER COMMISSION

DISTRICT

No. HM 06641

FAX NO. 1817 9241 P.11/17

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06642 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name RETEK Point of Collection Sheets

Method of Flow Measurement N/A Water Well

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	STAT STAMP (20)
			09	28	95	W

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)	00056	Water Temperature (°F)	00011	pH	00400
D.O. (mg/l)	00300	Turbidity (JTU)	00070		

TEXAS WATER COMMISSION

No. HM 06642 District 9

Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations Field Filtered

Total Dissolved Metals

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste water well

Method of Preservation HNO_3, Ice

Auxillary Tags

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic	Dissolved	Barium	"		
Cadmium	"	Chromium	"	Copper	"
Lead	"	Manganese	"	Mercury	"
Nickel	"	Selenium	"	Silver	"
Zinc	"	(Total Dissolved Metals)			

TEXAS WATER COMMISSION

DISTRICT 9

No. HM 06642

TWC-0287

DEC-14-95 THU 11:51 TNRCC 30 FAX NO. 1817---241 P. 06/17

TEXAS WATER COMMISSION

TWC 0287 (Rev.05-05-86)

No. HM 06643 District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge Time Collected

Plant Name RETEK Point of Collection Faske water well - QA Blank

Method of Flow Measurement N/A

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Dan Wyrick

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT. STAMP (20)
			09	28	95	W

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
0 0 0 5 G		0 0 0 1 1		0 0 4 0 0	
D.O. (mg/l)		Turbidity (JTU)			
0 0 3 0 0		0 0 0 7 0			

TEXAS WATER COMMISSION

No. HM 06643 District 9 Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste water well

Grab ✓ Composite Hr. Method of Preservation HNO_3

Observations Field Filtered Auxillary Tags

Total Dissolved Metals Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic	Dissolved	Barium	"		
Cadmium	"	Chromium	"	Copper	"
Lead	"	Manganese	"	Mercury	"
Nickel	"	Selenium	"	Silver	"
Zinc	"	(Total Dissolved Metals)			

TEXAS WATER COMMISSION
DISTRICT 9
No. HM 06643

TWC-0287

TEXAS WATER COMMISSION

TWC-0287 (Rev.05-05-86)

No. HM 06644

District 9 County Washington Basin Brazos Lab. LCRA

Discharger Name Old Brazos Forge

Time Collected

Plant Name BETEK

Point of Collection Blum water Well

Method of Flow Measurement N/A

Chlorine Contact Time N/A

Date Shipped 9/28/95 hand delivered

Collector's Signature Don Wyrick

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT. STAT. (20)
			09	28	95	W

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd) 00056		Water Temperature (°F) 00011		pH 00400	
D.O. (mg/l) 00300		Turbidity (JTU) 00070			

TEXAS WATER COMMISSION

No. HM 06644 District 9

Lab. Used LCRA Lab. No.

Type Sample: Heavy Metals

Material Sampled: Raw, Partially Treated, Final, Stream, Solid Waste Water Well

Grab ✓ Composite Hr.

Method of Preservation HNO3, Ice

Observations

Auxillary Tags AT040302, AT040301, & AT040302

Date Completed

Analyst's Signature

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic		Barium			
Cadmium		Chromium		Copper	
Lead		Manganese		Mercury	
Nickel		Selenium		Silver	
Zinc					

TEXAS WATER COMMISSION

DISTRICT 9

No. HM 06644

TWC 0287

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040301 Corresponds to HM 06647

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10-20-94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040302 Corresponds to HM 06647

Lab. No.

Date Taken 9/28/95 Time Taken

Date Sealed 9/28/95 Date Shipped 9/28/95

Method of Conveyance State vehicle (hand delivered)

Certification (Sig.) Don Wyrick

TWC 0169 (Rev. 10-20-94)

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

No. AT 040300 Corresponds to [illegible]

Lab No.

Date Taken [illegible] Time Taken

Date Sealed [illegible] Date Shipped [illegible]

Method of Conveyance [illegible]

Certification (Sig.) [illegible]

TWC-0169 (Rev. 10-20-94)

ATTACHMENT C

THE POWER TO MAKE A DIFFERENCE.

FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604755
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W
ORIGINAL DATE REPORTED: 11/17/.
DUPLICATE DATE REPORTED: 11/20/.
DATE RECEIVED: 11/15/
SAMPLE DATE: 11/15/
SAMPLE TIME: 1045
DEPTH:

LOCATION ID: SW 183558 Faske

PARAMETER	RESULTS	UNITS	METHOD #	MCL in WATER	DATE ANALYZED
Hexavalent chromium	0.01	mg/l	EPA7196	0.01	11/15/95

Buck Henderson

BUCK HENDERSON
LABORATORY MANAGER

QA APPROVED

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THE POWER TO MAKE A DIFFERENCE.

FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604756
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W
ORIGINAL DATE REPORTED: 11/17/9
DUPLICATE DATE REPORTED: 11/20/9
DATE RECEIVED: 11/15/9
SAMPLE DATE: 11/15/9
SAMPLE TIME: 1134
DEPTH:

LOCATION ID: SW 183564 Blum

PARAMETER	RESULTS	UNITS	METHOD #	MCL in WATER	DATE ANALYZED
Hexavalent chromium	0.09	mg/l	EPA7196	0.01	11/15/95

Buck Henderson

UCK HENDERSON
ABORATORY MANAGER

QA APPROVED

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LCRA
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FINAL ANALYSIS REPORT

PLICATE
LAB ID: 9604757
CILITY: TNRCC-CO
CCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W

ORIGINAL DATE REPORTED: 11/17/95
DUPLICATE DATE REPORTED: 11/20/95
DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 1210
DEPTH:

OCATION ID: SW 183567 Scheel

ARAMETER	RESULTS	UNITS	METHOD #	MCL in WATER	DATE ANALYZED
xavalent chromium	<0.01	mg/l	EPA7196	0.01	11/15/95

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CK HENDERSON
ORATORY MANAGER

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FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604758
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W
ORIGINAL DATE REPORTED: 11/17/9!
DUPLICATE DATE REPORTED: 11/20/9!
DATE RECEIVED: 11/15/9!
SAMPLE DATE: 11/15/9!
SAMPLE TIME: 1241
DEPTH:

LOCATION ID: SW 183570 Krueger

PARAMETER	RESULTS	UNITS	METHOD #	MCL in WATER	DATE ANALYZED
Hexavalent chromium	<0.01	mg/l	EPA7196	0.01	11/15/95

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UCK HENDERSON
ABORATORY MANAGER

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THE POWER TO MAKE A DIFFERENCE.

FINAL ANALYSIS REPORT

LAB ID: 9604759 SAMPLE TYPE: Drk. W

CILITY: TNRCC-CO ORIGINAL DATE REPORTED: 11/17/95

CCT NO: TNRCC-ERNEST HEYER

DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 1035
DEPTH:

OCATION ID: SW 183557 Faske

ARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
senic, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
rium, ICPMS	232.0	ug/L	EPA200.8	1.0	11/16/95
admium, ICPMS	<1.0	ug/L	EPA200.8	1.0	11/16/95
romium, ICPMS	59.9	ug/L	EPA200.8	1.0	11/16/95
pper, ICPMS	8.0	ug/L	EPA200.8	1.0	11/16/95
ead, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
nganese, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
rcury, Total-AA	<0.2	ug/L	EPA245.1	0.2	11/16/95
ickel, ICPMS	8.3	ug/L	EPA200.8	1.0	11/16/95
elenium, ICPMS	4.9	ug/L	EPA200.8	4.0	11/16/95
lver, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
nc, ICPMS	121.8	ug/L	EPA200.8	1.0	11/16/95

Roland Garcia for

K HENDERSON
BORATORY MANAGER

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THE POWER TO MAKE A DIFFERENCE.

FINAL ANALYSIS REPORT

LAB ID: 9604761 SAMPLE TYPE: Drk. W
.CILITY: TNRCC-CO ORIGINAL DATE REPORTED: 11/17/95
.CCT NO: TNRCC-ERNEST HEYER

DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 0007
DEPTH:

CATION ID: SW 183566 Scheel

RAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
senic, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
rium, ICPMS	132.9	ug/L	EPA200.8	1.0	11/16/95
dmium, ICPMS	<1.0	ug/L	EPA200.8	1.0	11/16/95
romium, ICPMS	51.2	ug/L	EPA200.8	1.0	11/16/95
pper, ICPMS	10.2	ug/L	EPA200.8	1.0	11/16/95
ad, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
nganese, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
rcury, Total-AA	<0.2	ug/L	EPA245.1	0.2	11/16/95
ckel, ICPMS	11.2	ug/L	EPA200.8	1.0	11/16/95
lenium, ICPMS	4.4	ug/L	EPA200.8	4.0	11/16/95
lver, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
nc, ICPMS	223.1	ug/L	EPA200.8	1.0	11/16/95

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FINAL ANALYSIS REPORT

LAB ID: 9604762 SAMPLE TYPE: Drk. W
FACILITY: TNRCC-CO ORIGINAL DATE REPORTED: 11/17/9
ACCT NO: TNRCC-ERNEST HEYER

DATE RECEIVED: 11/15/9
SAMPLE DATE: 11/15/9
SAMPLE TIME: 1127
DEPTH:

LOCATION ID: SW 183563 Blum

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Arsenic, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
Barium, ICPMS	293.1	ug/L	EPA200.8	1.0	11/16/95
Cadmium, ICPMS	<1.0	ug/L	EPA200.8	1.0	11/16/95
Chromium, ICPMS	152.8	ug/L	EPA200.8	1.0	11/16/95
Copper, ICPMS	32.1	ug/L	EPA200.8	1.0	11/16/95
Lead, ICPMS	3.6	ug/L	EPA200.8	1.0	11/16/95
Manganese, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
Mercury, Total-AA	<0.2	ug/L	EPA245.1	0.2	11/16/95
Nickel, ICPMS	17.9	ug/L	EPA200.8	1.0	11/16/95
Selenium, ICPMS	6.9	ug/L	EPA200.8	4.0	11/16/95
Silver, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
Zinc, ICPMS	458.1	ug/L	EPA200.8	1.0	11/16/95

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LABORATORY MANAGER

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FINAL ANALYSIS REPORT

:AB ID: 9604763 SAMPLE TYPE: Drk. W
:ILITY: TNRCC-CO ORIGINAL DATE REPORTED: 11/17/95
:CT NO: TNRCC-ERNEST HEYER

DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 1238
DEPTH:

:ATION ID: SW 183569 Krueger

:AMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
enic, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
ium, ICPMS	293.8	ug/L	EPA200.8	1.0	11/16/95
mium, ICPMS	<1.0	ug/L	EPA200.8	1.0	11/16/95
omium, ICPMS	47.6	ug/L	EPA200.8	1.0	11/16/95
per, ICPMS	7.3	ug/L	EPA200.8	1.0	11/16/95
d, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
ganese, ICPMS	18.4	ug/L	EPA200.8	1.0	11/16/95
cury, Total-AA	<0.2	ug/L	EPA245.1	0.2	11/16/95
kel, ICPMS	8.9	ug/L	EPA200.8	1.0	11/16/95
enium, ICPMS	<4.0	ug/L	EPA200.8	4.0	11/16/95
ver, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
c, ICPMS	764.6	ug/L	EPA200.8	1.0	11/16/95

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: HENDERSON
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FINAL ANALYSIS REPORT

LAB ID: 9604760
SAMPLE TYPE: Drk. W
CILITY: TNRCC-CO
ORIGINAL DATE REPORTED: 11/17/95
CCT NO: TNRCC-ERNEST HEYER

DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 0800
DEPTH:

OCATION ID: SW 183561 Field Blank

ARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
senic, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
arium, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
admium, ICPMS	<1.0	ug/L	EPA200.8	1.0	11/16/95
romium, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
pper, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
ead, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
nganese, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
rcury, Total-AA	<0.2	ug/L	EPA245.1	0.2	11/16/95
ickel, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
lenium, ICPMS	<4.0	ug/L	EPA200.8	4.0	11/16/95
lver, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95
inc, ICPMS	<2.0	ug/L	EPA200.8	1.0	11/16/95

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FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604764
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W

ORIGINAL DATE REPORTED: 12/04
DUPLICATE DATE REPORTED: 12/06
DATE RECEIVED: 11/15
SAMPLE DATE: 11/15
SAMPLE TIME: 1030
DEPTH:

LOCATION ID: SW 183556 Faske

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZE
Cyanide, Total	<0.020	mg/L	EPA335.2	0.020	11/29/9

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LABORATORY MANAGER

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FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604765
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W

ORIGINAL DATE REPORTED: 12/04/9
DUPLICATE DATE REPORTED: 12/06/9
DATE RECEIVED: 11/15/9
SAMPLE DATE: 11/15/9
SAMPLE TIME: 1122
DEPTH:

LOCATION ID: SW 183559 Blum

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Cyanide, Total	<0.020	mg/L	EPA335.2	0.020	11/29/95

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FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604766
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W
ORIGINAL DATE REPORTED: 12/04/
DUPLICATE DATE REPORTED: 12/06/
DATE RECEIVED: 11/15/
SAMPLE DATE: 11/15/
SAMPLE TIME: 1205
DEPTH:

LOCATION ID: SW 183565 Scheel

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZEI
Cyanide, Total	<0.020	mg/L	EPA335.2	0.020	11/29/9:

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FINAL ANALYSIS REPORT

DUPLICATE
LAB ID: 9604767
FACILITY: TNRCC-CO
ACCT NO: TNRCC-ERNEST HEYER

SAMPLE TYPE: Drk. W
ORIGINAL DATE REPORTED: 12/04/95
DUPLICATE DATE REPORTED: 12/06/95
DATE RECEIVED: 11/15/95
SAMPLE DATE: 11/15/95
SAMPLE TIME: 1236
DEPTH:

LOCATION ID: SW 183568 Krueger

PARAMETER	RESULTS	UNITS	METHOD #	PQL in WATER	DATE ANALYZED
Cyanide, Total	<0.020	mg/L	EPA335.2	0.020	11/29/95

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QUALITY CONTROL DATA REPORT

REPORT DATE: 12/12/95

% SPIKE RECOVERY

SAMPLE ID	Hg-AA	As	Ba	Cd	Cr	Cu	Pb	Mn	Ni	Se	Ag	Zn
9604759-63 Total	90.2	141.2**	92.0	97.4	95.7	98.8	98.2	97.1	96.9	158.9**	89.6	95.0
UPPER LIMIT	130	130	130	130	130	130	130	130	130	130	130	130
LOWER LIMIT	70	70	70	70	70	70	70	70	70	70	70	70

RELATIVE % DEVIATION

SAMPLE ID	Hg-AA	As	Ba	Cd	Cr	Cu	Pb	Mn	Ni	Se	Ag	Zn
9604759-63 Total	-1.8	-1.9	-3.5	-1.5	-1.7	-0.4	-0.1	-0.2	-0.9	-1.5	0.9	-16.3*
UPPER LIMIT	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15	+15
LOWER LIMIT	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15

% STANDARD RECOVERY

SAMPLE ID	Hg-AA	As	Ba	Cd	Cr	Cu	Pb	Mn	Ni	Se	Ag	Zn
9604759-63 Total	94.0	96.9	97.6	99.9	104.2	105.3	99.2	105.6	102.2	102.3	99.4	105.0
UPPER LIMIT	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0
LOWER LIMIT	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0

* Dilution required on sample.

** Above QC limits due to matrix effect.

Buck Henderson

BUCK HENDERSON
LABORATORY MANAGER

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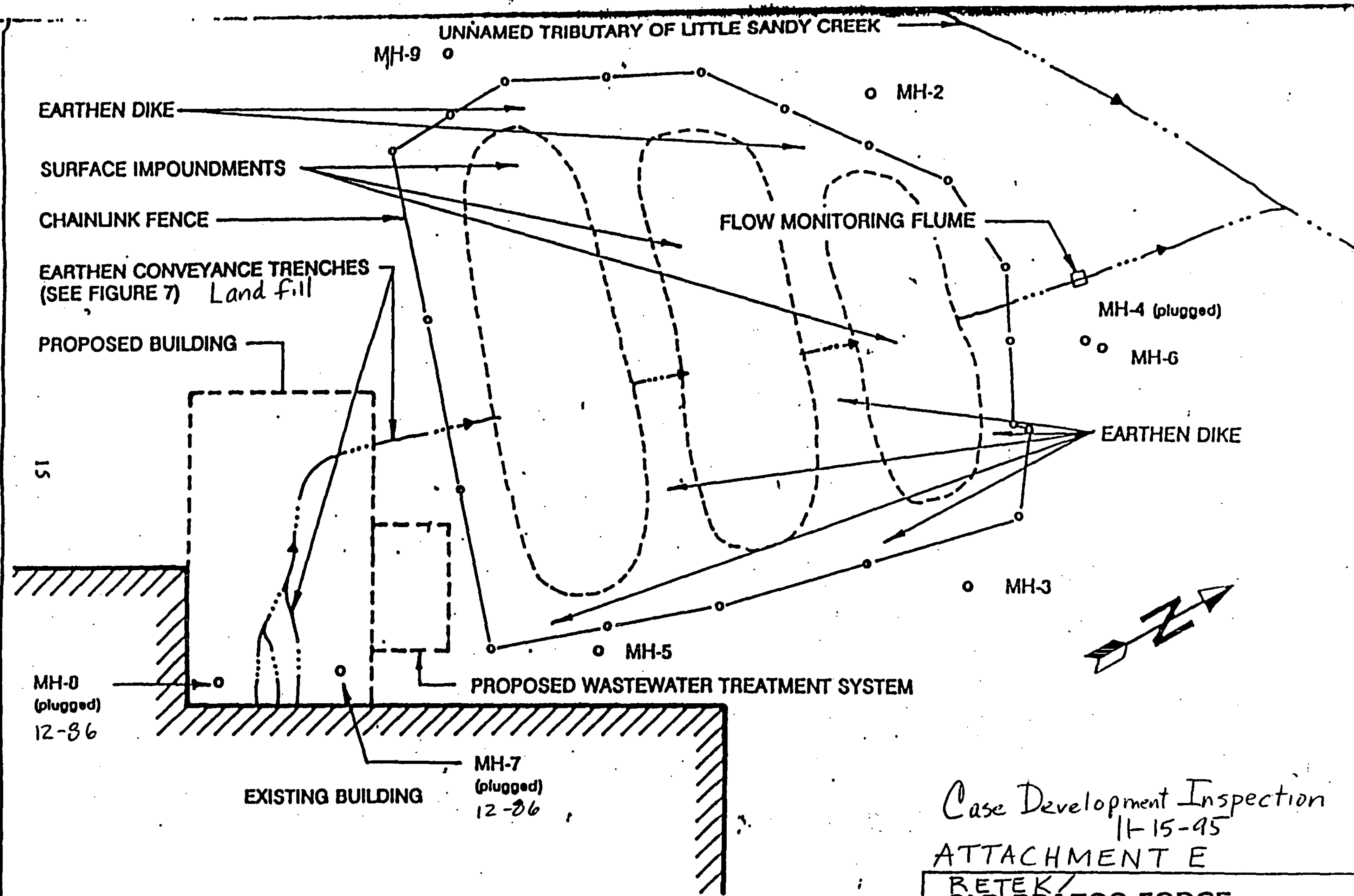
ATTACHMENT D

RETEK/Old Brazos Forge
S.W.R. Nos. 82313 & 30897
Brenham, Texas
Case Development Inspection
11-15-95
ATTACHMENT D

ATTACHMENT E



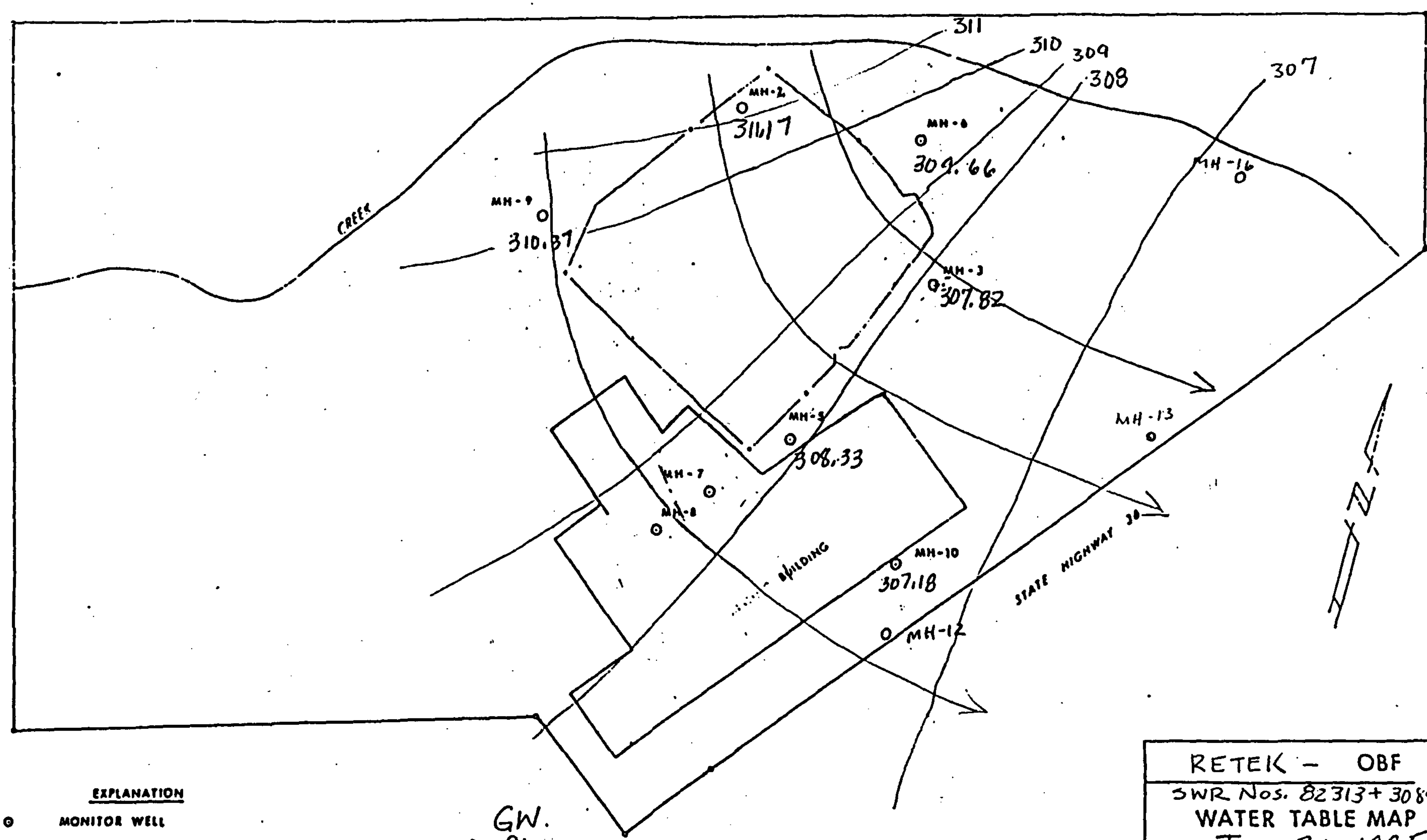
Case Development Inspection 11-15-95

ATTACHMENT E

RETEK/
OLD BRAZOS FORGE
S.W.R. Nos. 82313 + 30897

Location of Trench Landfill

Source: O'Malley and Clay, Inc., Letter to TDWR, Jan., 1984



EXPLANATION

MONITOR WELL

WATER TABLE ELEVATION

WATER TABLE CONTOUR

APPROXIMATE SCALE : 1" = 100'

GW. flow direction

MH-7 & MH-8 - plugged in 1986

MH-12, MH-13, MH-16 - installed in 1989; not sampled for post-closure monitoring

RETEK - OBF

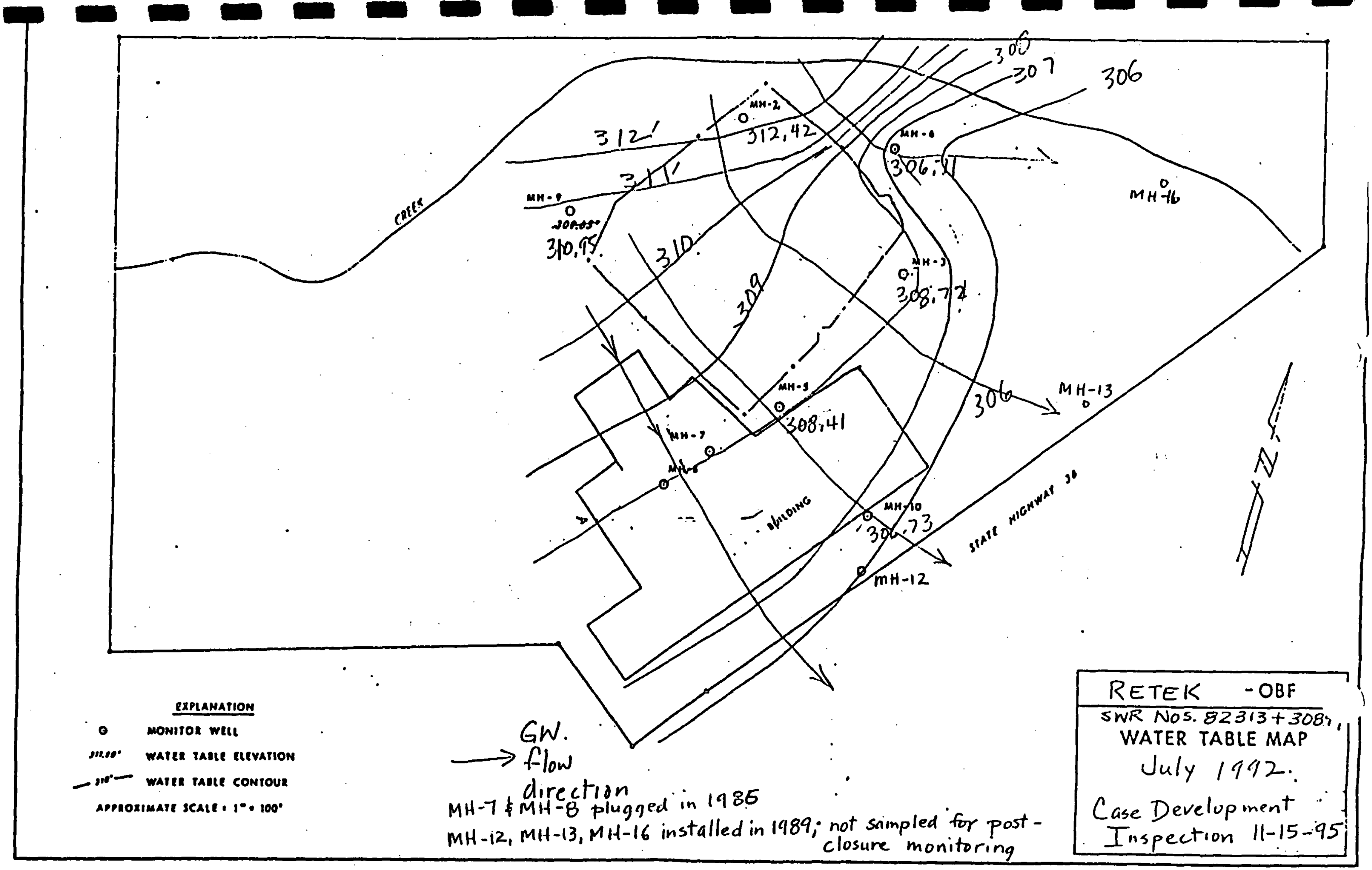
SWR Nos. 82313 + 30841

WATER TABLE MAP

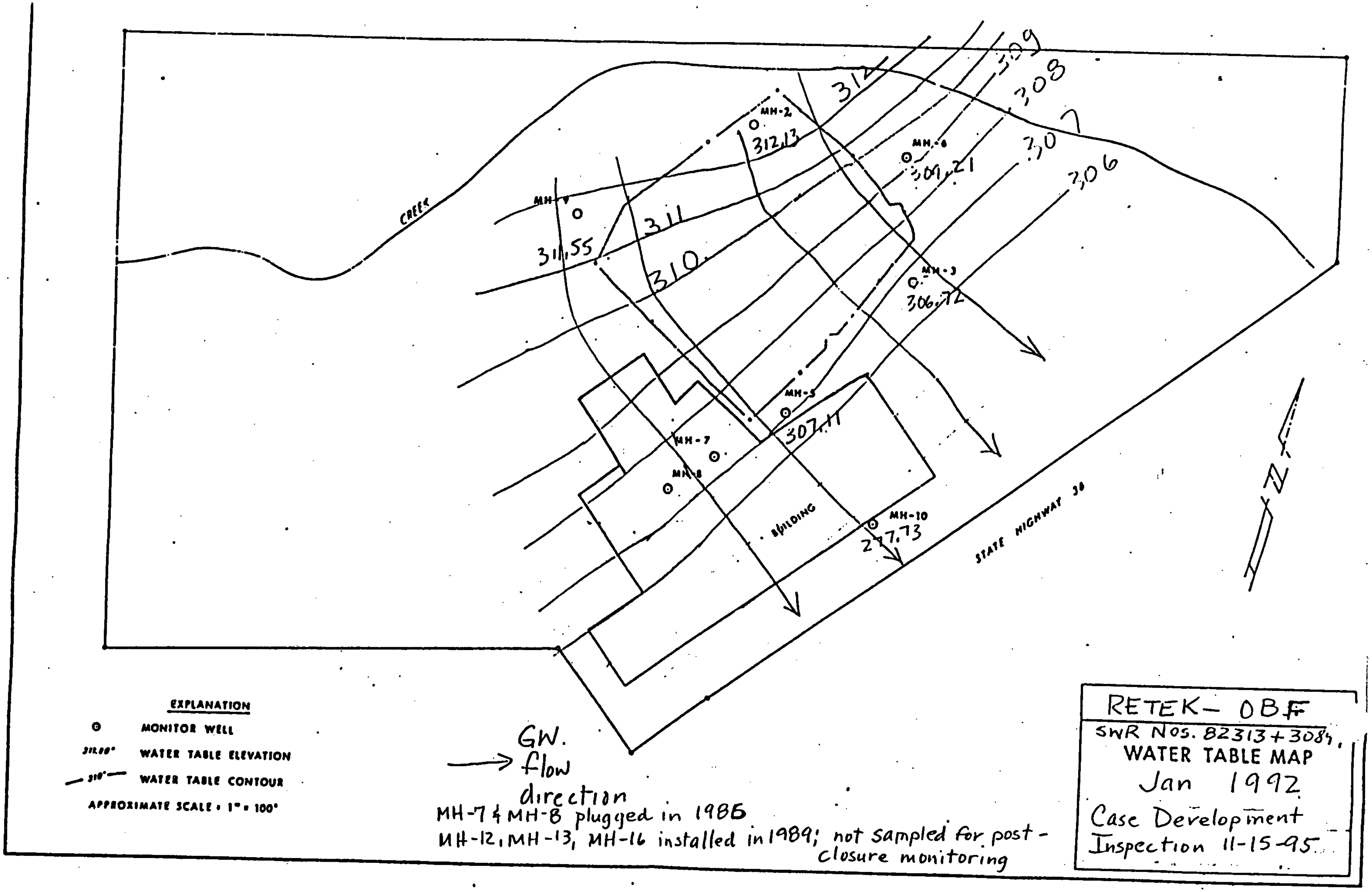
Jan. 26, 1995

Case Development Inspection 11-15-95

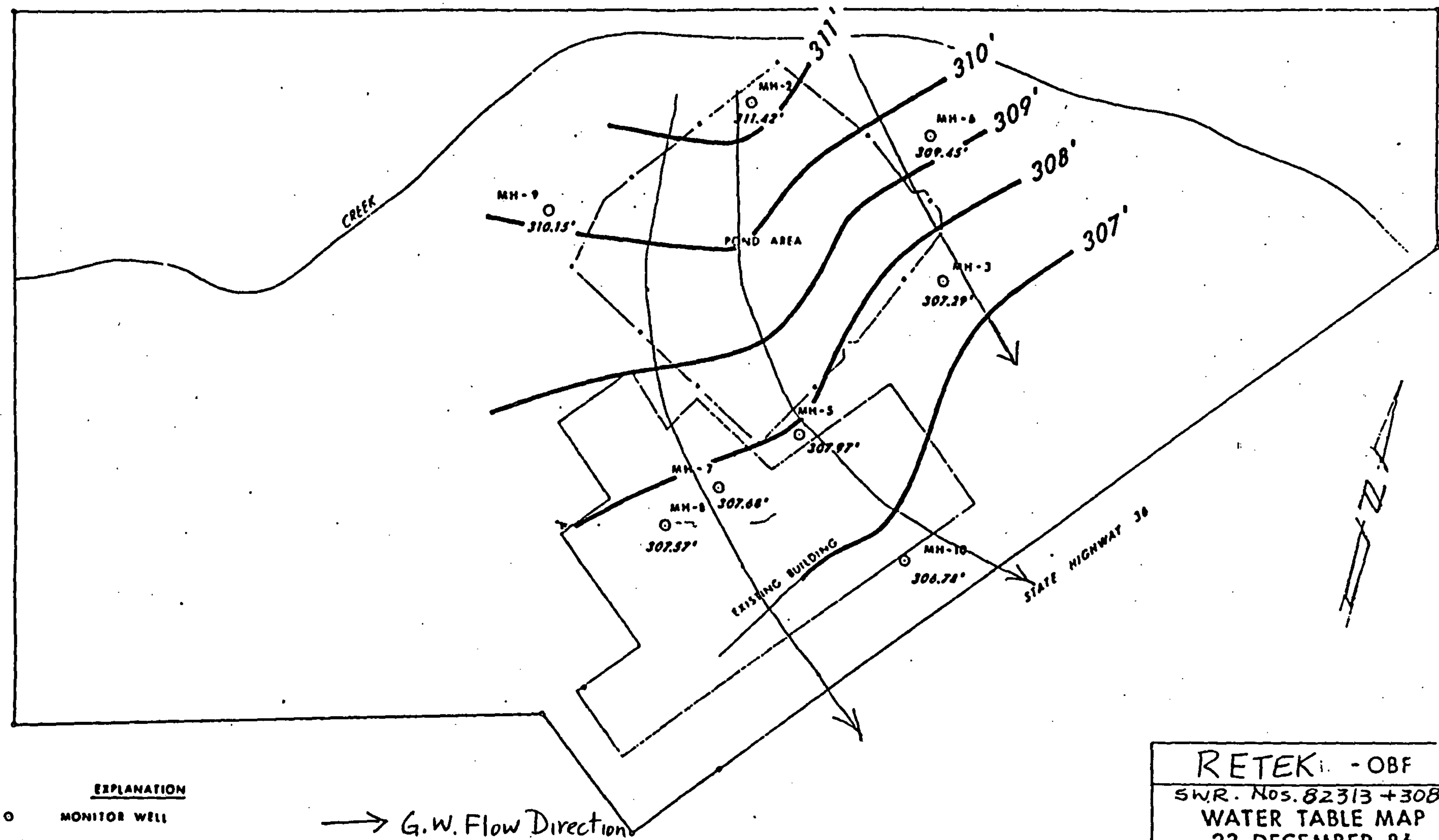
Attachment E



Attachment E



Attachment E



EXPLANATION

o MONITOR WELL

WATER TABLE ELEVATION

WATER TABLE CONTOUR

SCALE : 1" = 100'

→ G.W. Flow Direction

MH-7 & MH-8 plugged in 1986

RETEK - OBF

SWR. Nos. 82313 + 30897

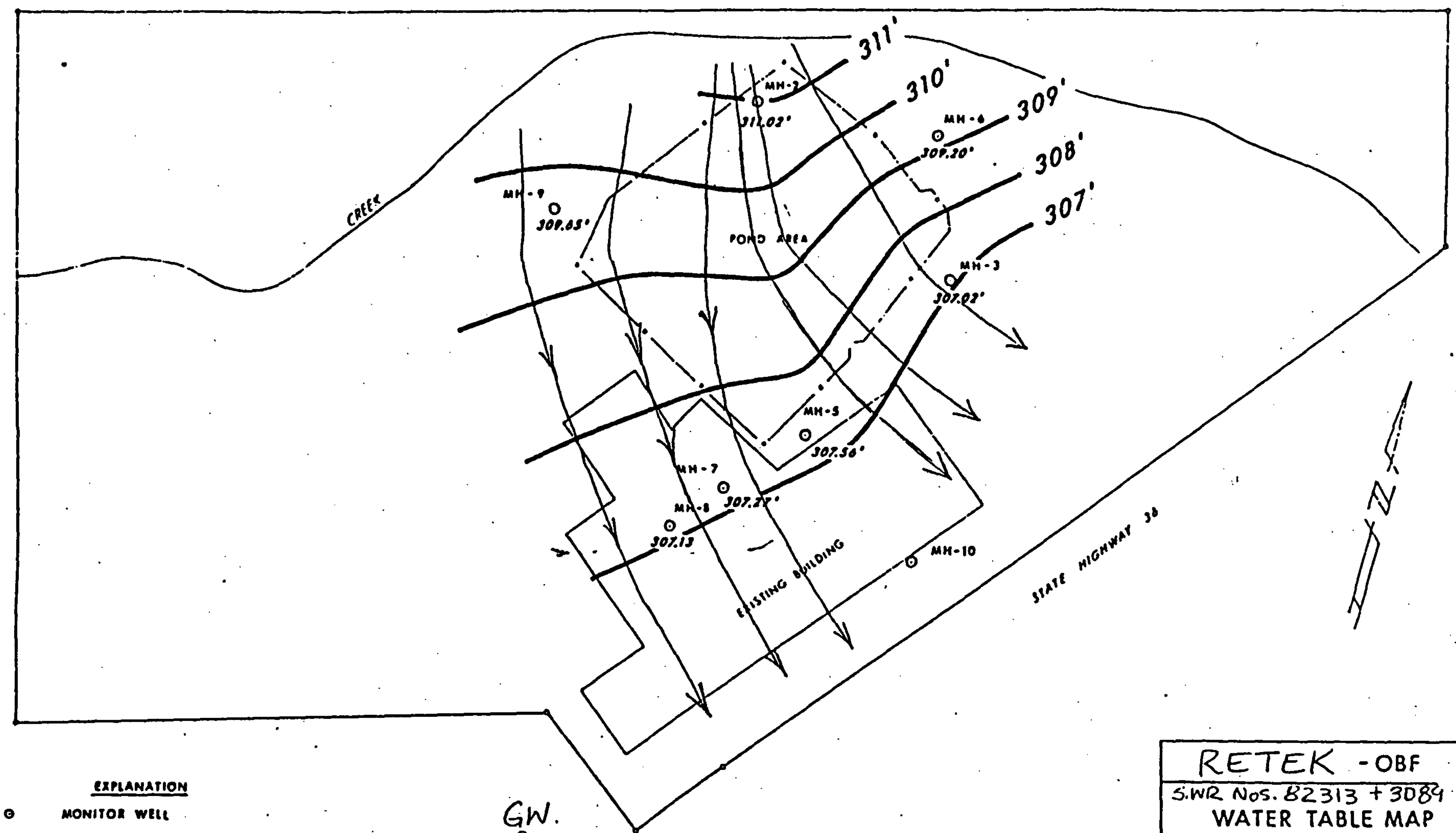
WATER TABLE MAP

23 DECEMBER 86

Case Development

Inspection 11-15-95

Attachment E



EXPLANATION

⊙ MONITOR WELL

311.00' WATER TABLE ELEVATION

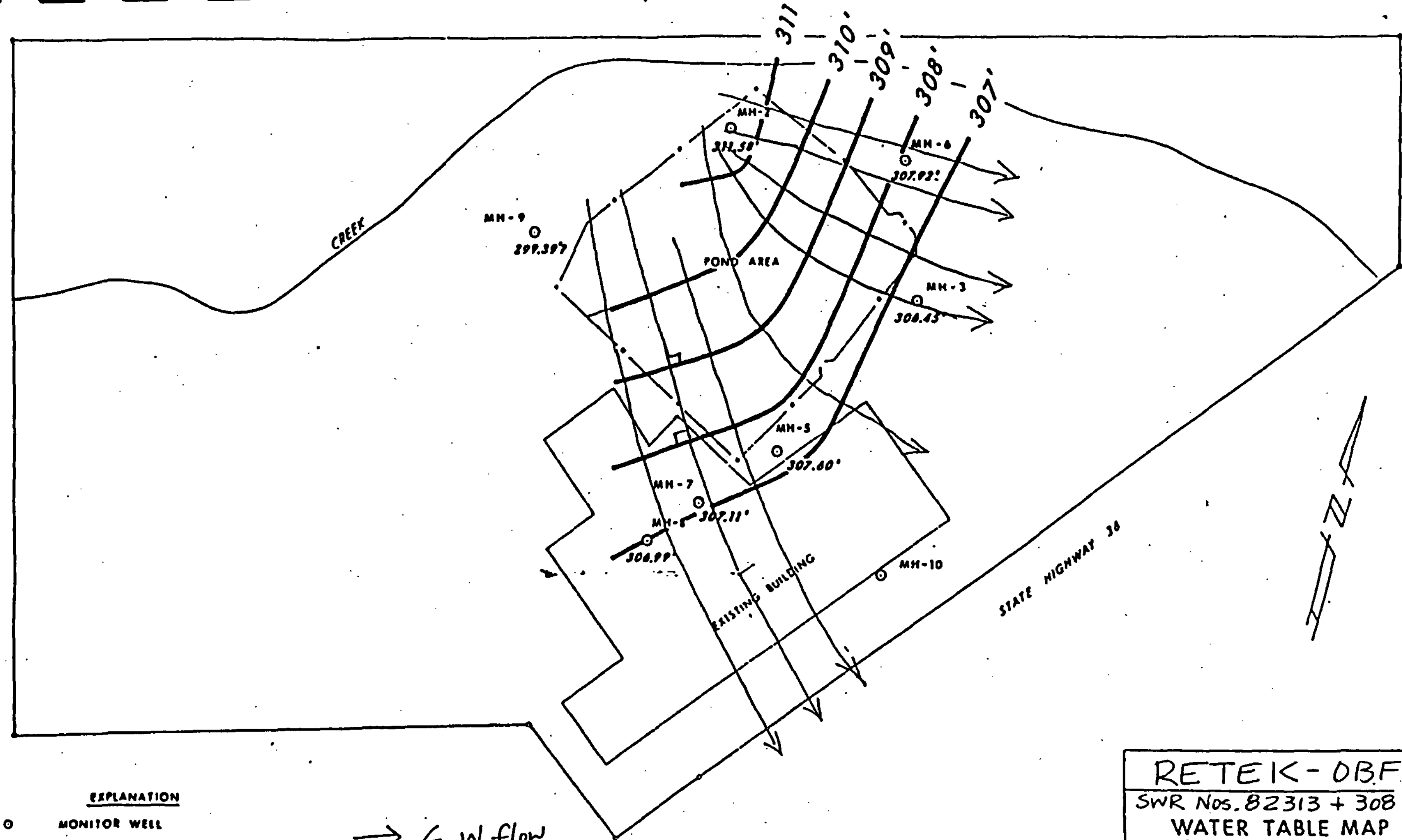
—310'— WATER TABLE CONTOUR

APPROXIMATE SCALE : 1" = 100'

GW.
→ flow
direction
MH-7 & MH-8 plugged in 1986

RETEK -OBF
S.WR Nos. 82313 + 3089
WATER TABLE MAP
9 JUNE 86
Case Development
Inspection
11-15-95

Attachment E



RETEK-OBF
SWR Nos. 82313 + 308
WATER TABLE MAP
14 NOVEMBER 85

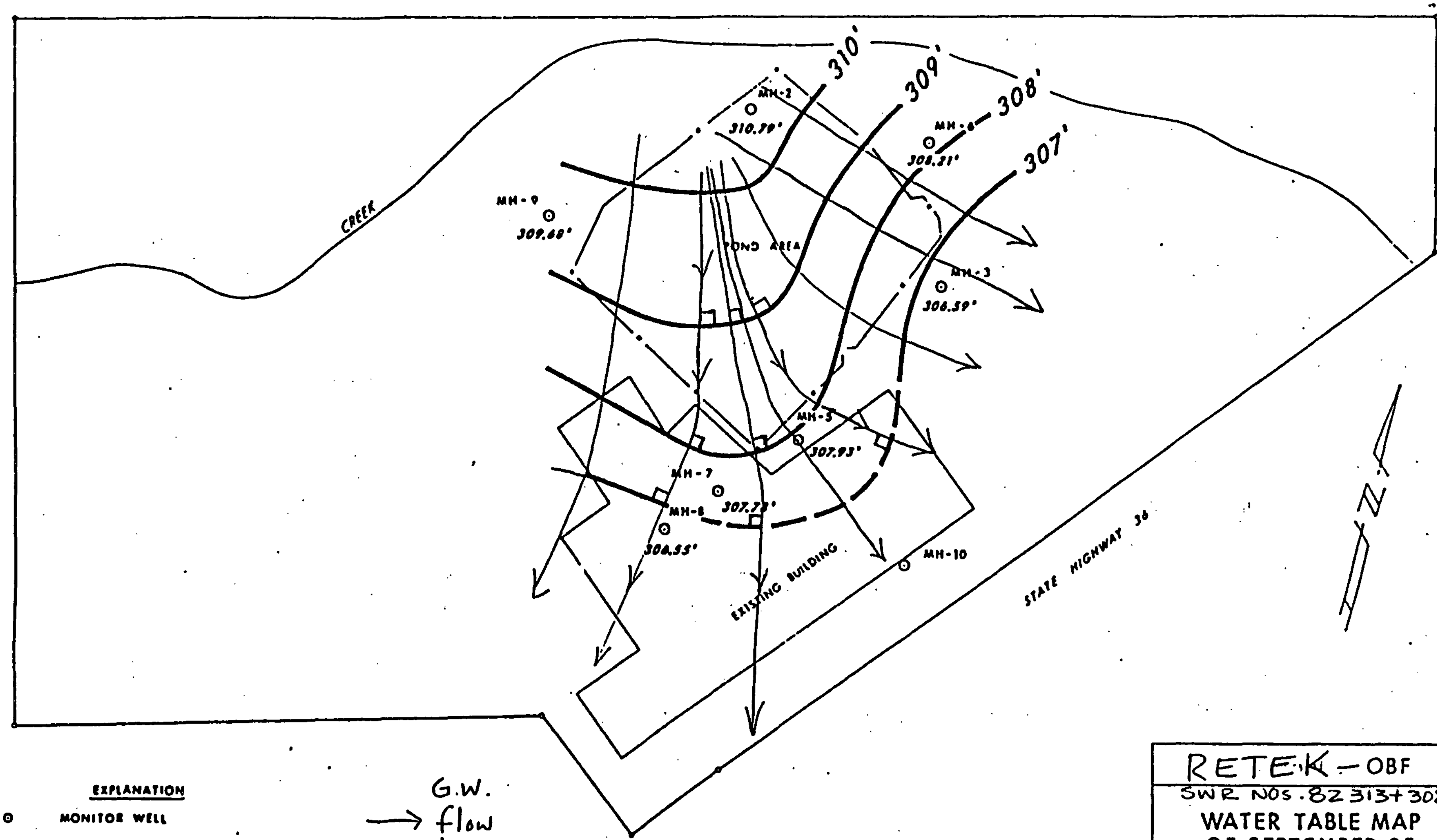
Case Development
Inspection 11-15-95

EXPLANATION

- ʘ MONITOR WELL
- 311.00' WATER TABLE ELEVATION
- — 310' — WATER TABLE CONTOUR (Excluding MH-9)
- APPROXIMATE SCALE: 1" = 100'

→ G.W. flow direction

Attachment E



→ G.W. flow direction

EXPLANATION

⊙ MONITOR WELL

311.00' WATER TABLE ELEVATION

310' WATER TABLE CONTOUR

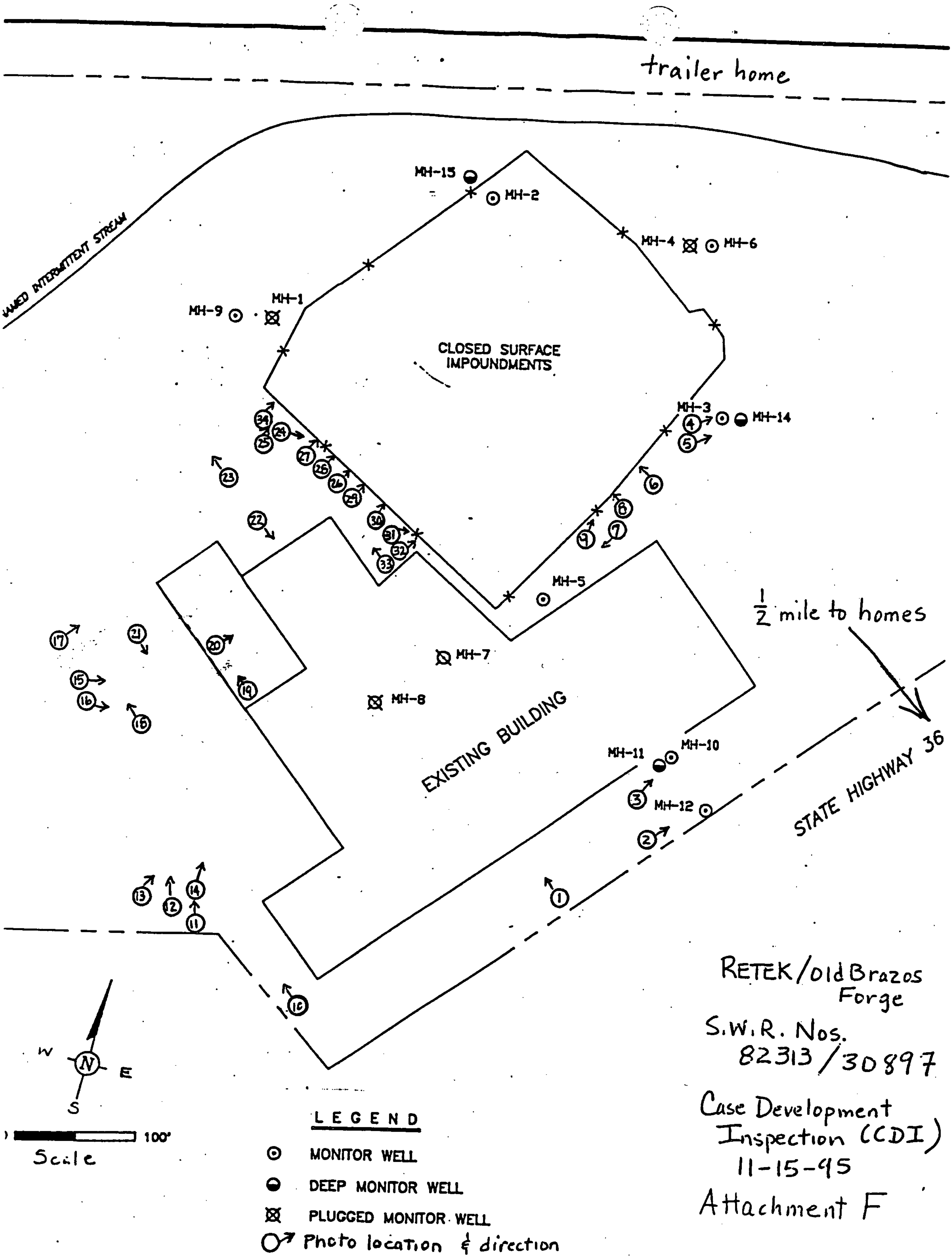
APPROXIMATE SCALE : 1" = 100'

NOTE: Water levels measured by Aqua Tech Laboratories

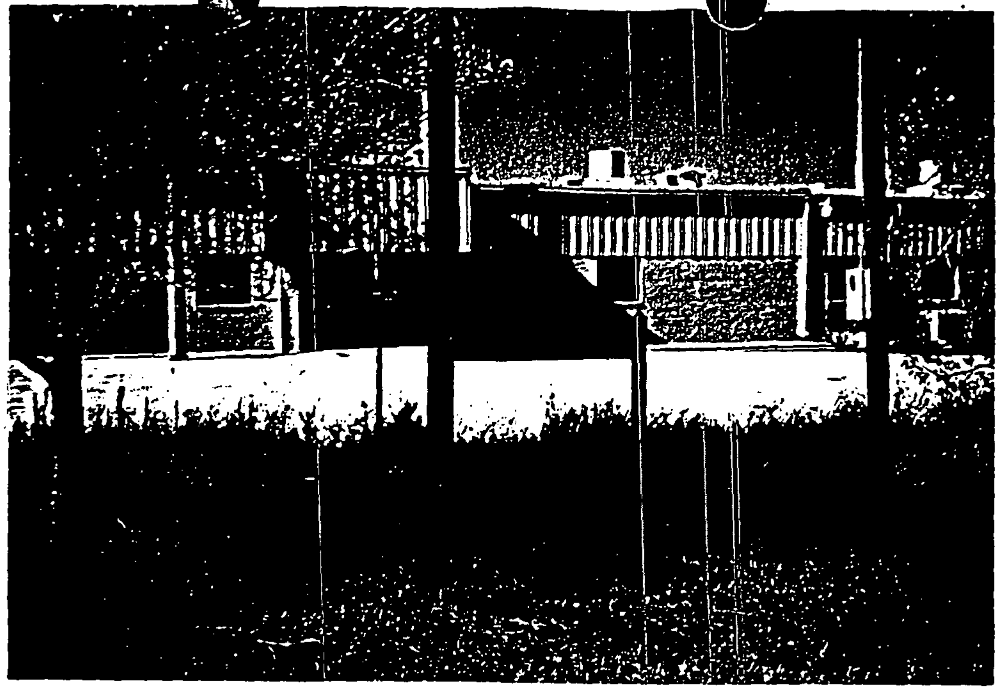
RETEK – OBF
SWR NOS. 82313+308
WATER TABLE MAP
25 SEPTEMBER 85
Case Development
Inspection 11-15-95

Attachment E

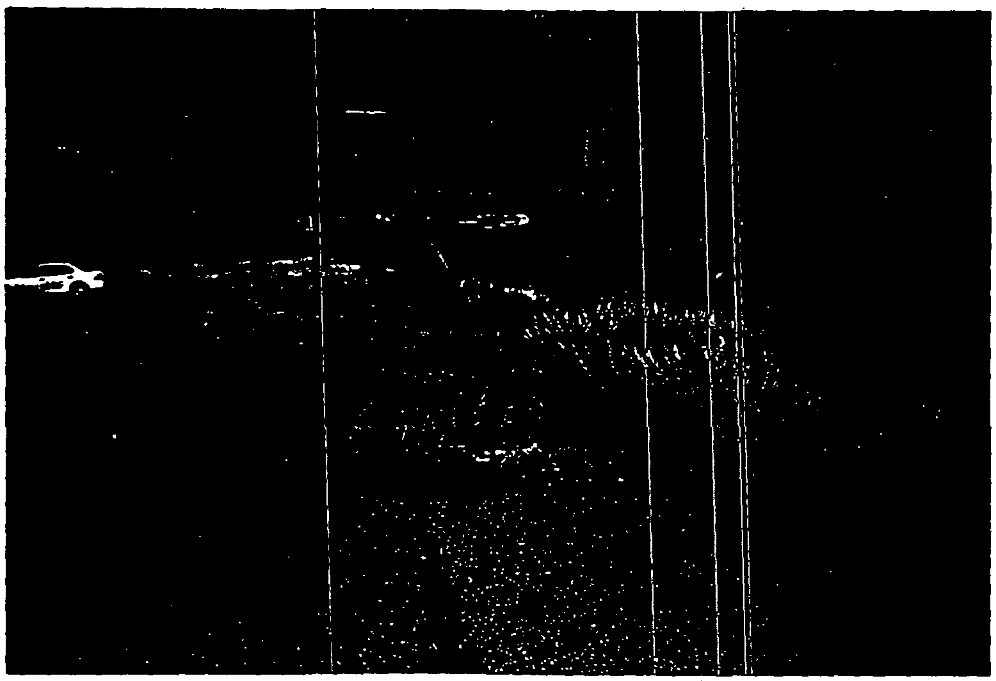
ATTACHMENT F


trailer home
NAMED INTERMITTENT STREAM
MH-15
MH-2
MH-4
MH-6
MH-9
MH-1
CLOSED SURFACE IMPOUNDMENTS
MH-3
MH-14
MH-5
MH-7
MH-8
EXISTING BUILDING
MH-11
MH-10
MH-12
STATE HIGHWAY 36
1/2 mile to homes
W
E
S
N
100'
Scale
LEGEND
MONITOR WELL
DEEP MONITOR WELL
PLUGGED MONITOR WELL
Photo location & direction
RETEK/Old Brazos Forge
S.W.R. Nos. 82313/30897
Case Development Inspection (CDI)
11-15-95
Attachment F

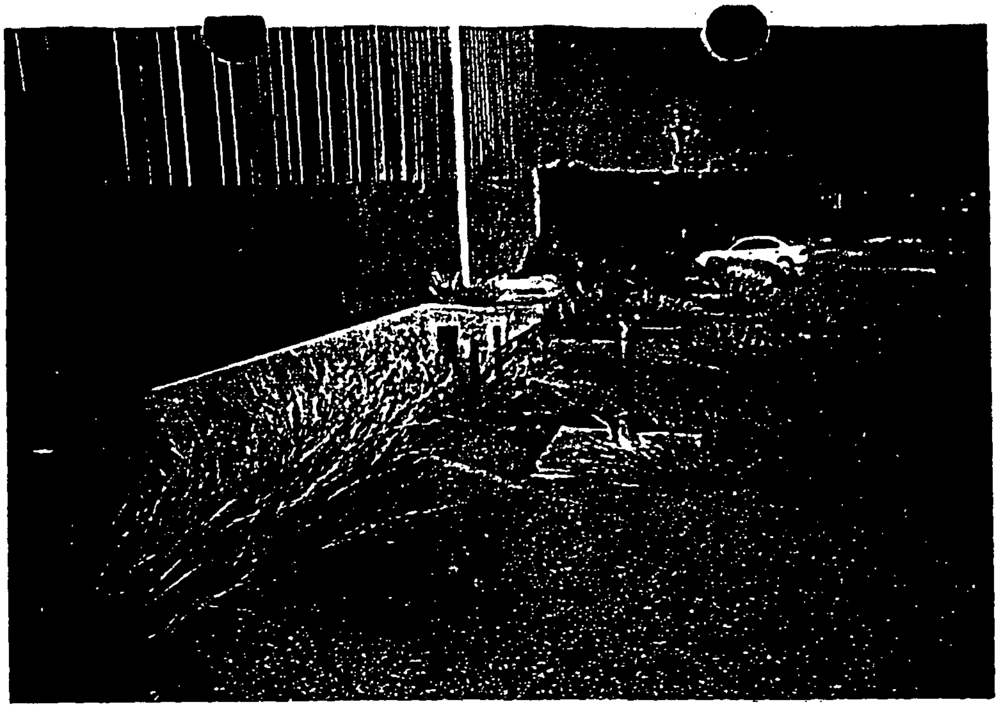
[redacted]BF [redacted]re[redacted]n,
[redacted]SWR Nos. 82313 & 30897
TNRCC Photographs



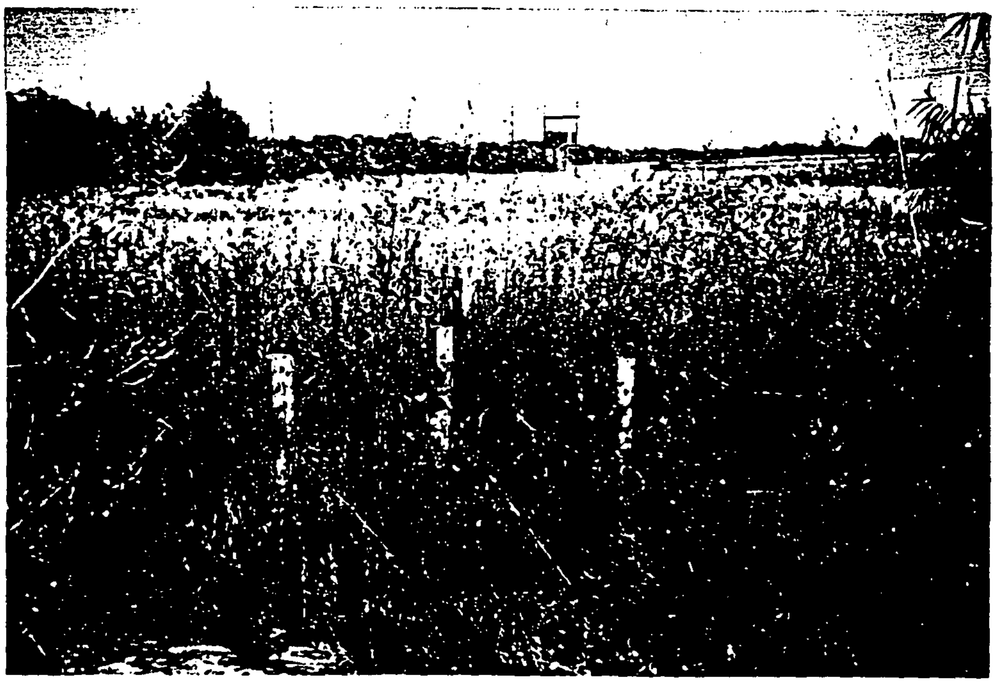
1. The front of the inactive RETEK building is shown here. Note the marquis in the foreground. Direction is facing the northwest. The photograph was taken on November 15, 1995.



2. Well MH-12, the front parking area and Highway 36 are shown here. Note that the outer casing to the well is bent and there are no bumper poles to protect the well in an area subject to vehicular traffic. Direction is facing the northeast. The photograph was taken on November 15, 1995.

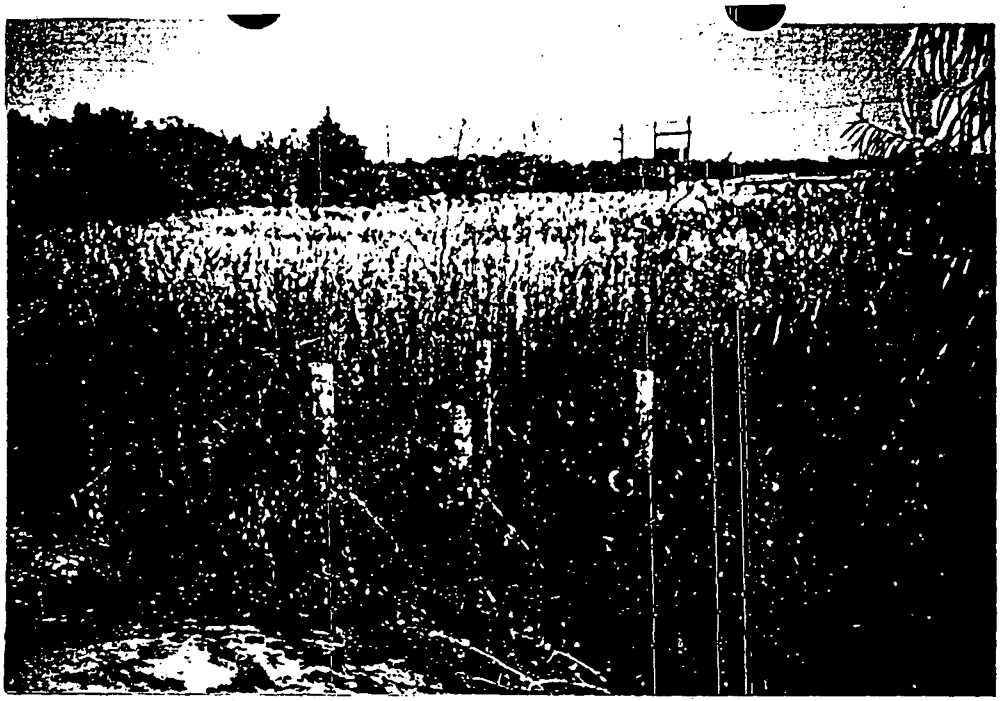


3. Wells MH-10 (blue) and MH-11 (silver) in the front of the building are shown here. Well MH-10 was not locked and MH-11 did not have any bumper poles to protect against vehicular traffic. Direction is facing the northeast. The photograph was taken on November 15, 1995.

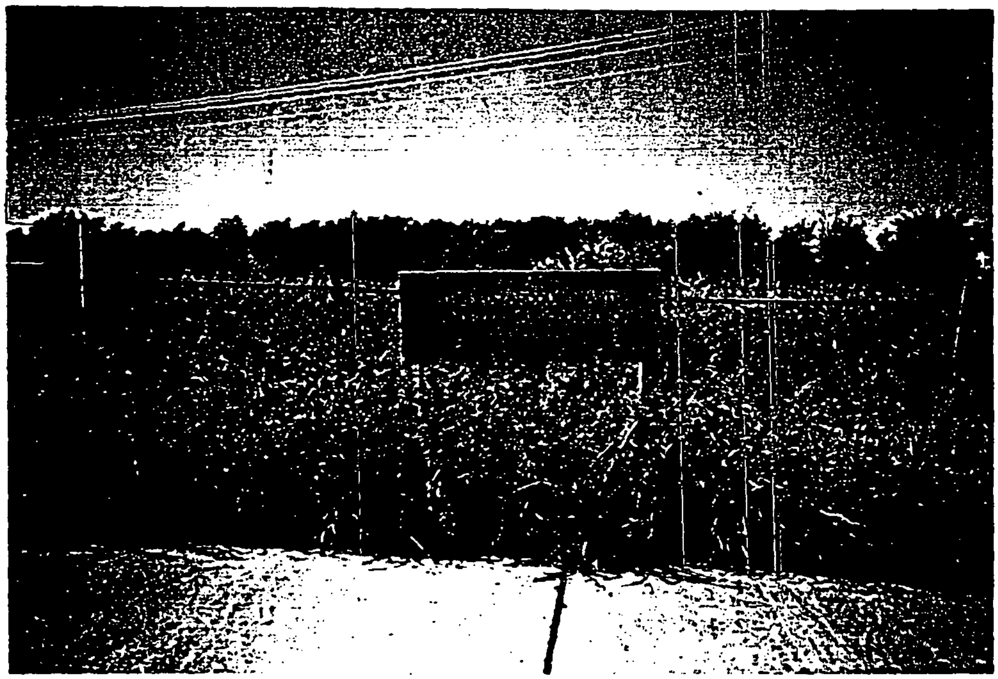


4. Wells MH-3 (white) and MH-14 (silver) are shown here. Note the rusted drum to the right of the wells. Note that a bumper pole for well MH-3 is bent. Note the high vegetation around the wells that preclude easy access to them. Direction is facing the northeast. The photograph was taken on November 15, 1995.

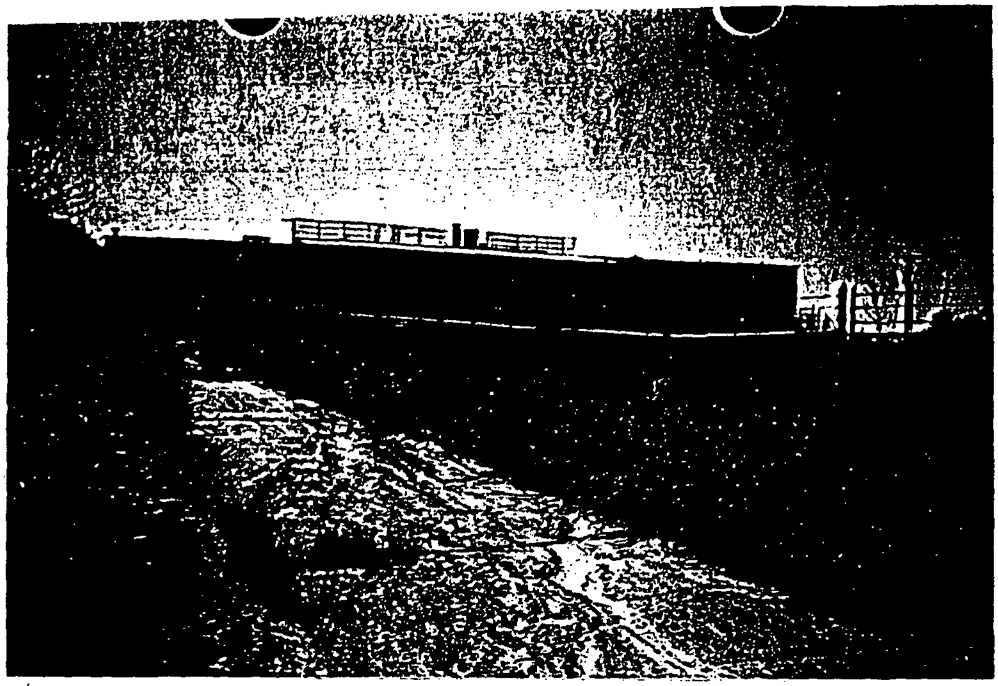
[redacted]ETH[redacted]BF[redacted]Bre[redacted]m,
SWR Nos. 82313 & 30897
TNRCC Photographs



5. Wells MH-3 (white) and MH-14 (silver) are shown here. Note the rusted drum to the right of the wells. Note that a bumper pole for well MH-3 is bent. Note the high vegetation around the wells that preclude easy access to them. Direction is facing the northeast. The photograph was taken on November 15, 1995.



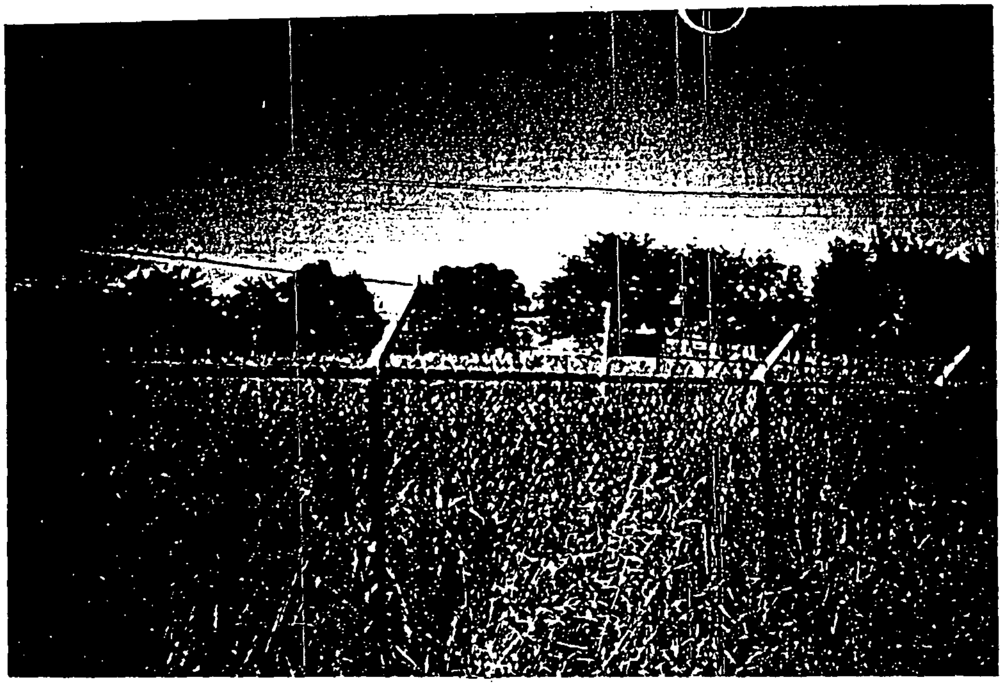
6. The closed hazard waste landfill is shown here. Note that the legend on the sign does not read "Danger - Unauthorized Personnel Keep Out", as required by 40 CFR 265.14. Note the tall, dry vegetative cover has not been mowed or watered. The trees in the background line the adjacent creek. Direction is facing the west. The photograph was taken on November 15, 1995.



7. The loading dock driveway in the northwest corner of the building is shown here. Note the water stains from previous cooling water releases on the driveway. The hazardous waste landfill is on the right side of the picture. Note the high vegetation on the landfill. Direction is facing the southwest. The photograph was taken on November 15, 1995.

8. The front of the closed hazardous waste landfill is shown here. Note overgrown vegetation on top of landfill and the trailer house with the well in the background across the creek from the landfill. Direction is facing west. This photograph was taken on November 15, 1995.

SWR Nos. 82313 & 30897
TNRCC Photographs



9. The front of the closed hazardous waste landfill is shown here. Note overgrown vegetation on top of landfill and the trailer house with the well in the background across the creek from the landfill. Direction is facing north. This photograph was taken on November 15, 1995.

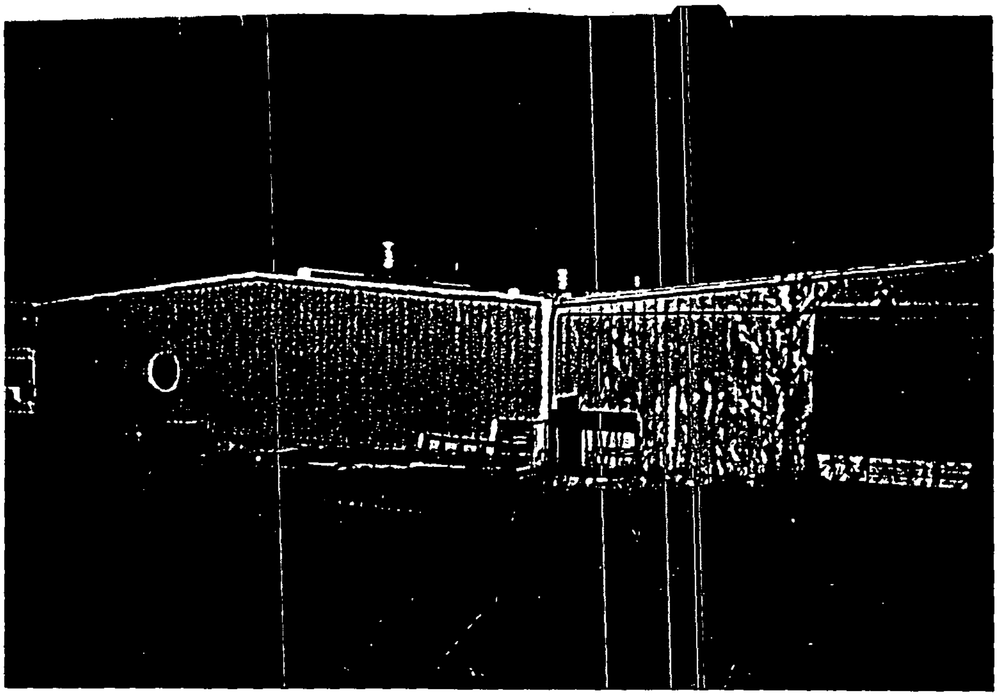
10. Retek processing equipment and plastic materials are shown here in the driveway on the south end of the building. Note the low barbed wire fencing on the left. Direction is facing the northwest. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

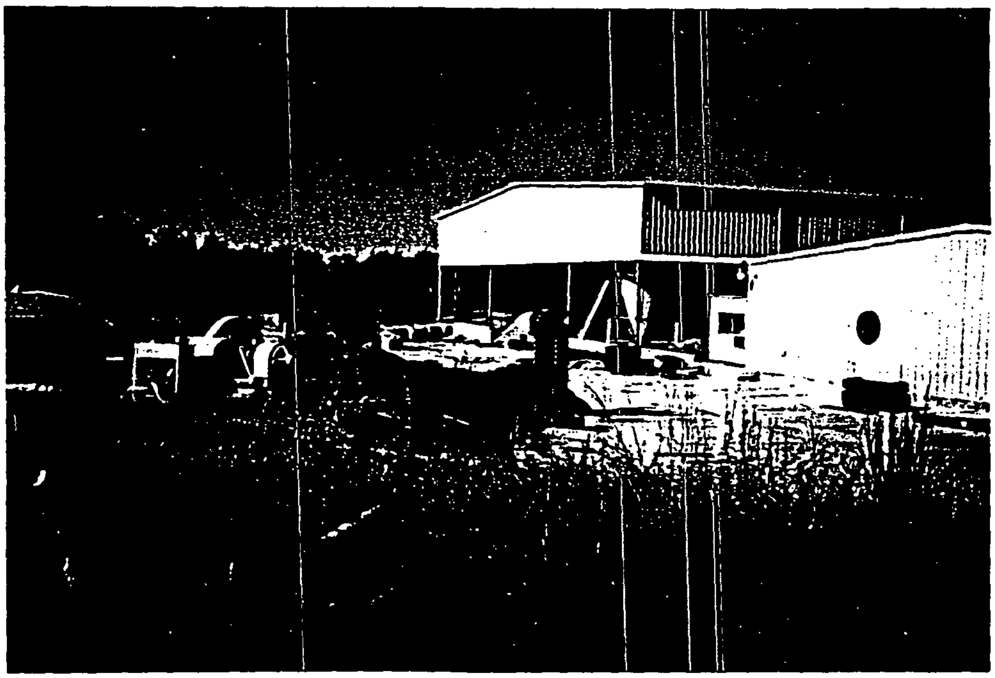
11. Retek processing equipment on the south end of the building. Note water well in the foreground. Direction is facing the north. Photograph was taken on November 15, 1995.

12. Retek processing equipment on the south end of the building. Note water well in the foreground. Direction is facing the north. Photograph was taken on November 15, 1995.

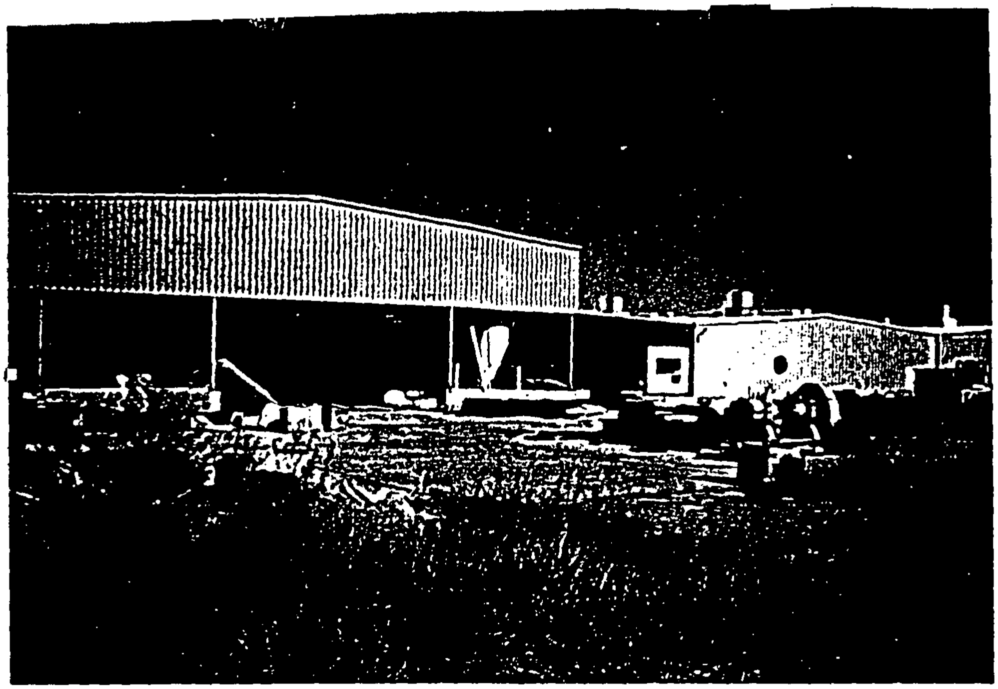
[redacted]EK[redacted] - [redacted]enh[redacted], T
SWR Nos. 82313 & 30897
TNRCC Photographs



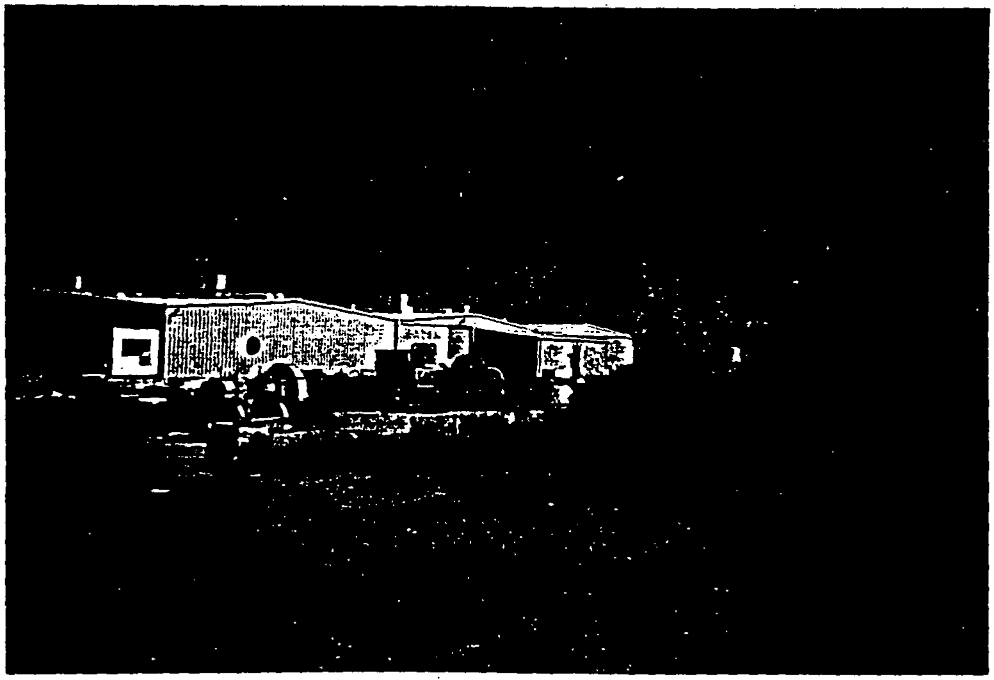
13. The south end of the building is shown here. Note the wooden and plastic pallets. Direction is facing northeast. Photograph was taken on November 15, 1995.



14. The south end of the building is shown here. Note the plastic materials in the background and processing equipment and drum in the foreground. Direction is facing north. Photograph was taken on November 15, 1995.

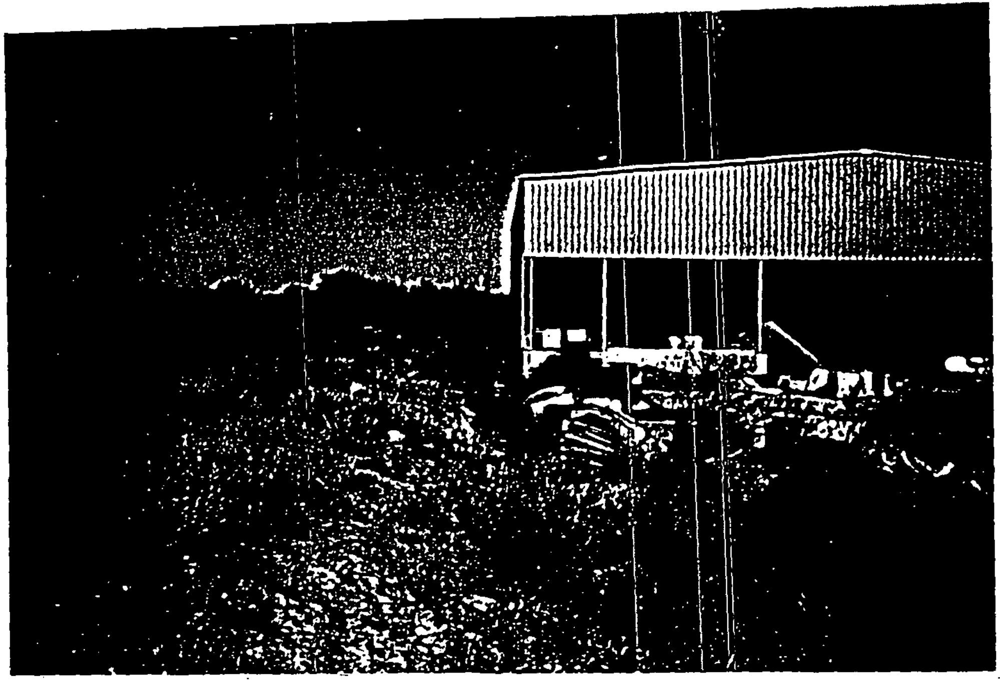


15. Processing equipment and plastics on the northwest end of the building are shown here. Direction is facing the east. Photograph was taken on November 15, 1995.



16. Processing equipment on the south end of the building is shown here. Direction is facing the southeast. Photograph was taken on November 15, 1995.

R[redacted]K/[redacted] - [redacted]nham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs



17. The northwest corner of the building is shown here. Note plastic pallets in the foreground. Direction is facing the northeast. Photograph was taken on November 15, 1995.

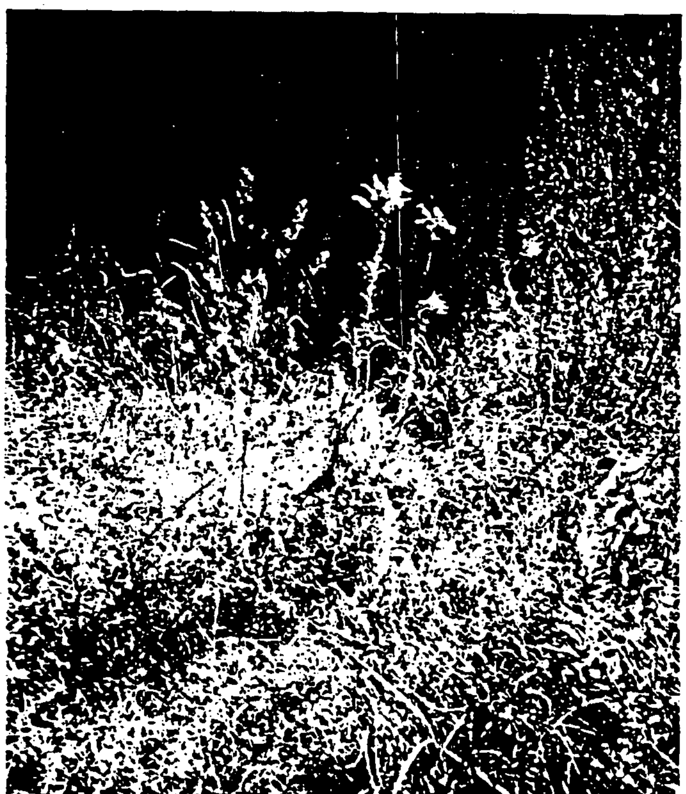
18. The south end of the building is shown here. Note drum in the foreground and processing equipment and plastics in the background. Direction is facing the northwest. Photograph was taken on November 15, 1995.

19. Plastic materials in a processing area on the northwest corner of the building are shown here. Direction is facing northwest. Photograph was taken on November 15, 1995.

20. Plastic materials and a wooden pallet are shown here. Direction is facing the northeast. Photograph was taken on November 15, 1995.

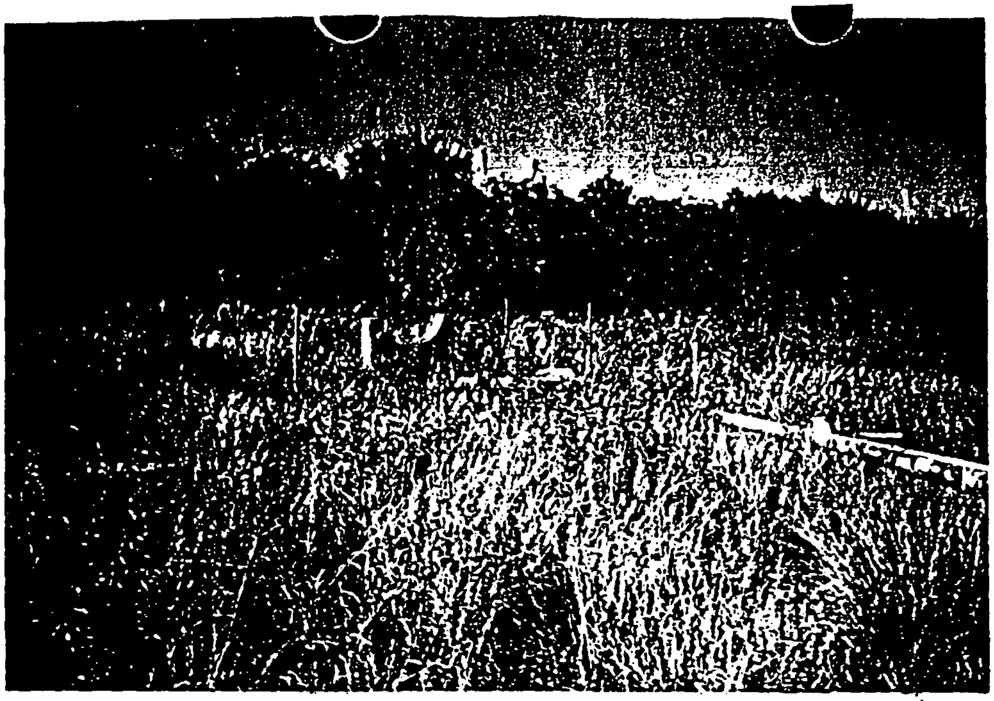
[redacted]TEK/OSF [redacted] Brenham, Tx
SWR Nos. 82313 & 30897
TNRCC Photographs

21. The northwest corner of the building is shown here. Note the pile of plastics and drum in the background, wooden pallets and the concrete sump in the foreground. Direction is facing southeast. Photograph was taken on November 15, 1995.



22. The northwest end of the building is shown here. Note the drainage pathway from the building in the foreground. Direction is facing southeast. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

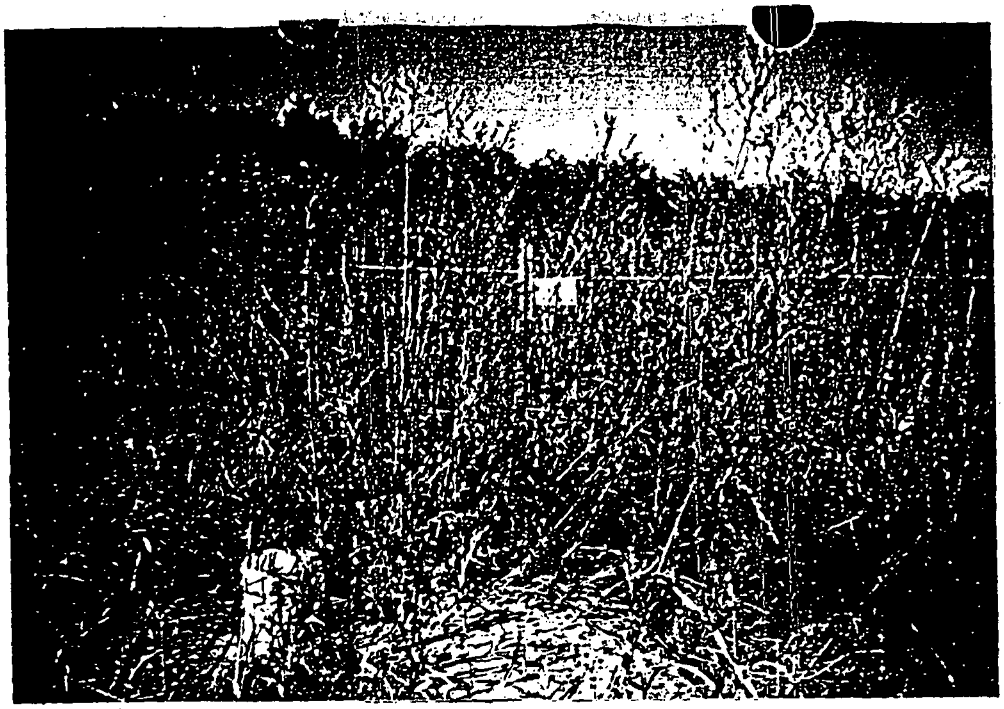


23. The septic tank field is shown here. Direction is facing the northwest. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

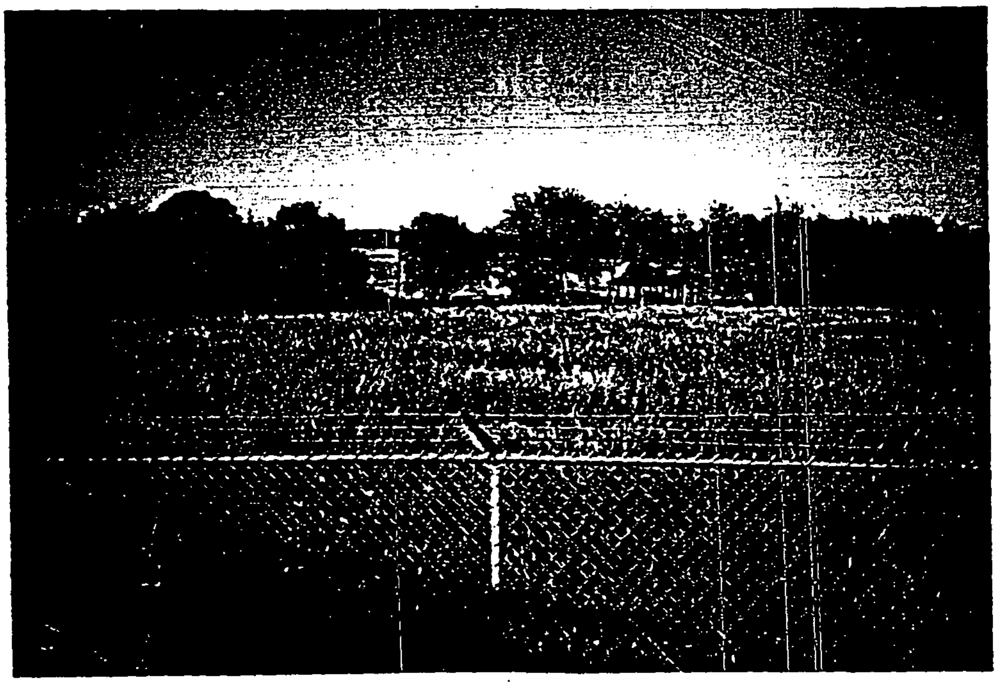
24. The northwest end of the building, overlooking the closed hazardous waste landfill, is shown here. Note the lack of signs on the landfill gate and the high vegetation. Direction is facing the east. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs



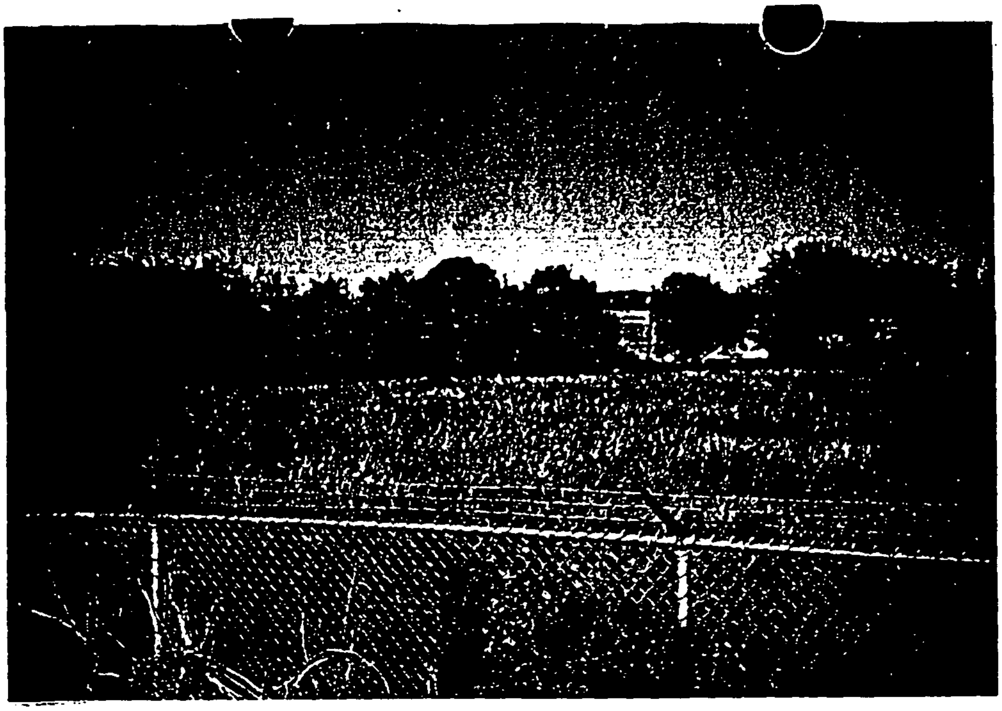
25. The closed hazardous waste landfill is shown here with the direction facing northeast. Note the overgrown vegetation and lack of a readable sign to deter unauthorized entry. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs



26. The closed hazardous waste landfill is shown here. Note the lack of signs to deter unauthorized entry, trailer house with a well in the background and trees lining the creek. Direction is facing the northeast. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

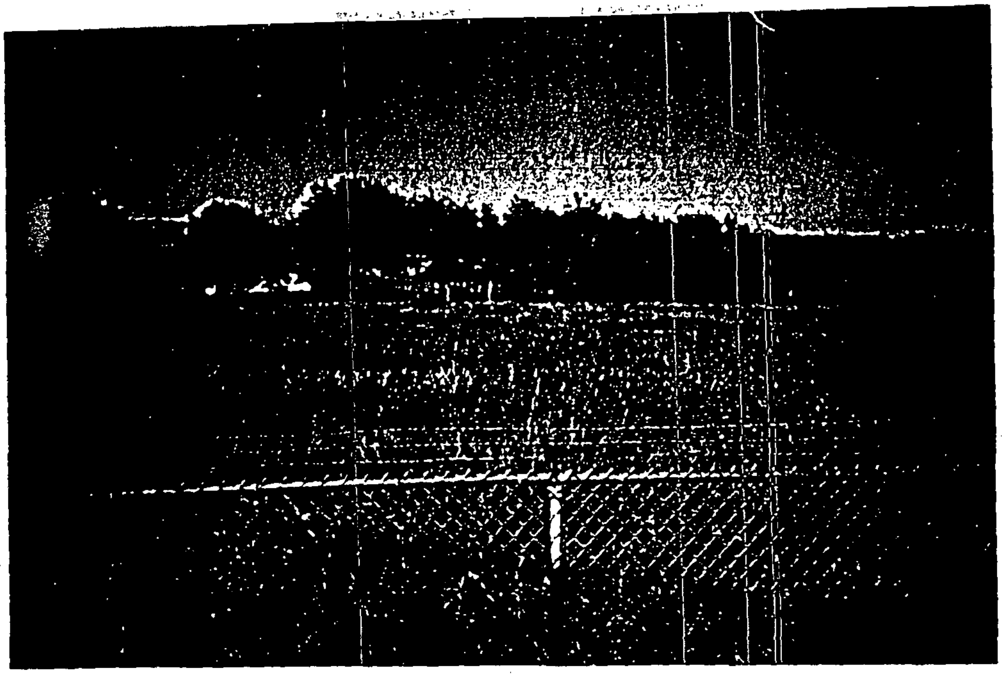


27. The closed hazardous waste landfill is shown here. Note the lack of signs to deter unauthorized entry, trailer house with a well in the background and trees lining the creek. Direction is facing the northeast. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

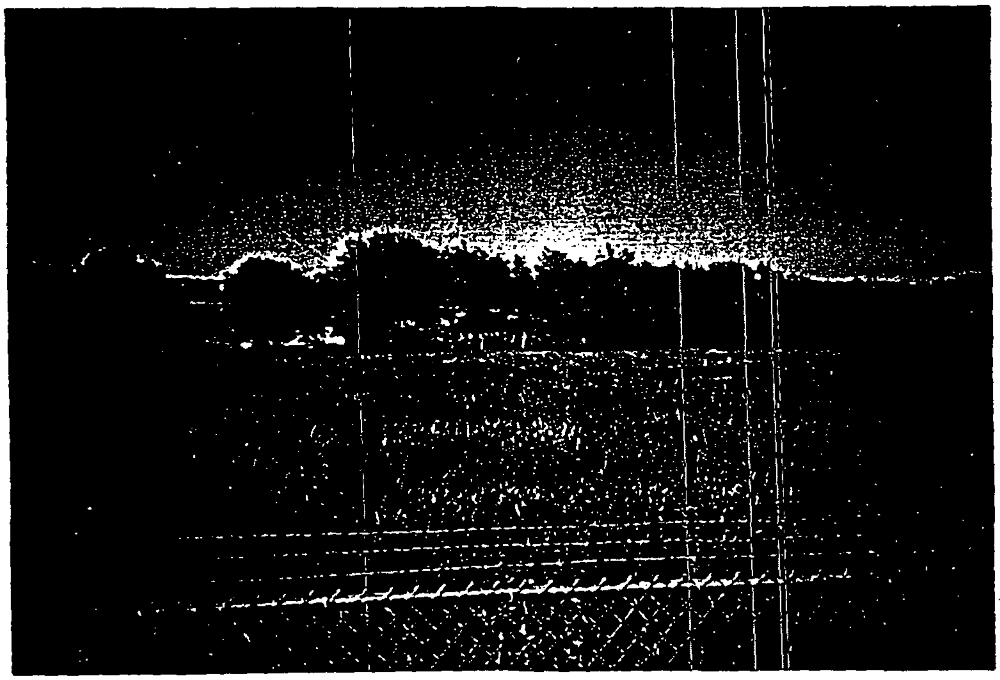
28. The closed hazardous waste landfill is shown here. Note the lack of signs to deter unauthorized entry, trailer house with a well in the background and trees lining the creek. Direction is facing the northeast. Photograph was taken on November 15, 1995.

[redacted] SWR Nos. 82313 & 30897
TNRCC Photographs



29. The closed hazardous waste landfill is shown here. Note the lack of signs to deter unauthorized entry, trailer house with a well in the background and trees lining the creek. Direction is facing the northeast. Photograph was taken on November 15, 1995.

[redacted] SWR Nos. 82313 & 30897
TNRCC Photographs



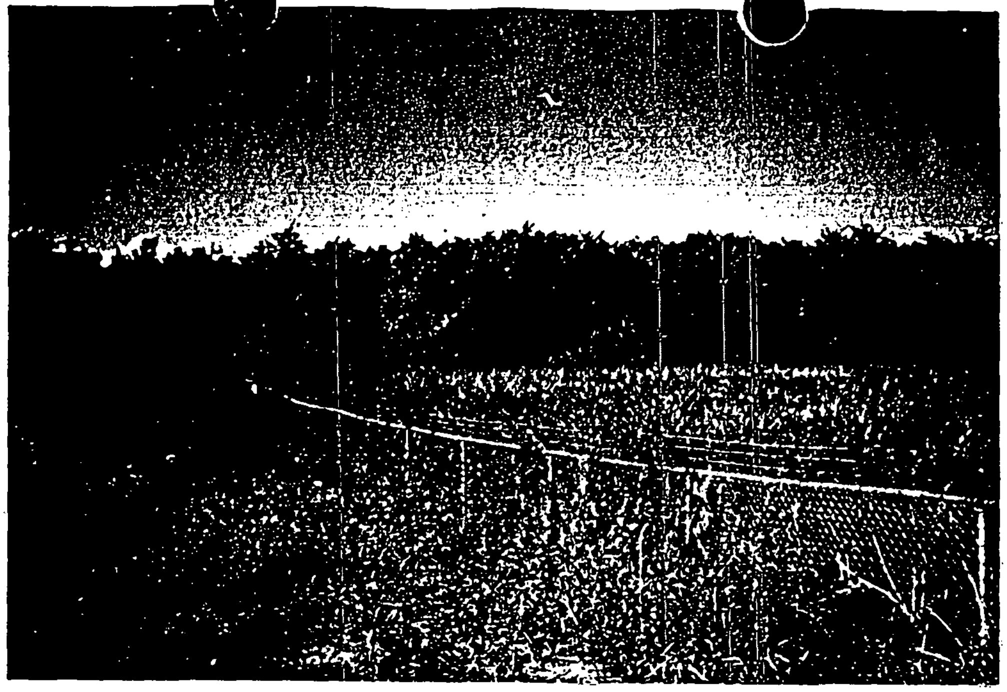
30. The closed hazardous waste landfill is shown here. Note the lack of signs to deter unauthorized entry, trailer house with a well in the background and trees lining the creek. Direction is facing the northeast. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

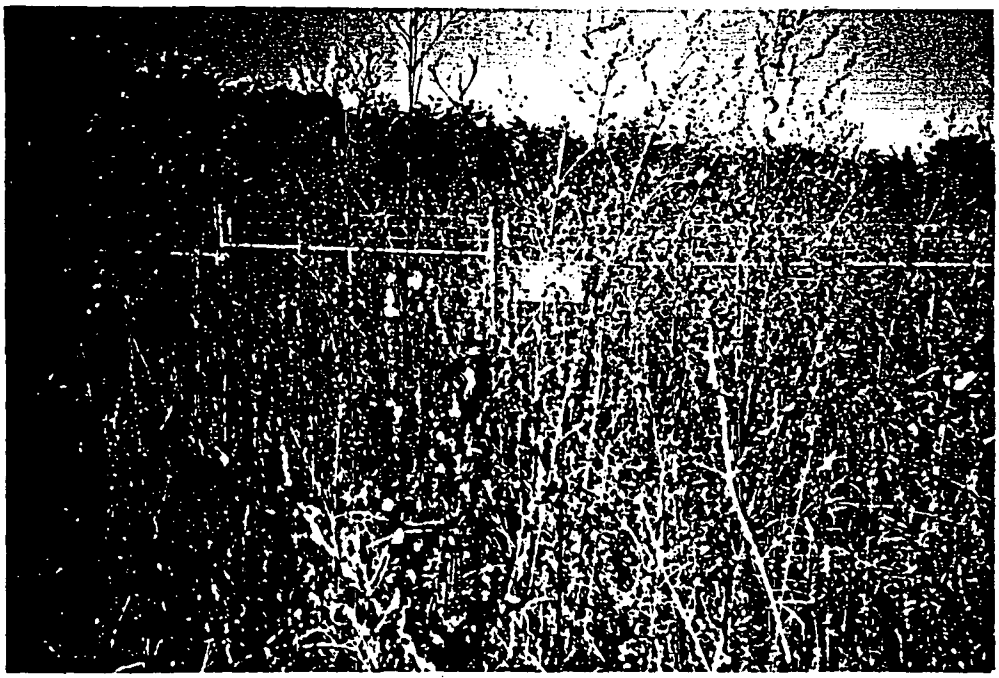
31. This view overlooks the closed hazardous waste landfill towards Highway 36. Direction is facing east. Photograph was taken on November 15, 1995.

RETEK/OBF - Brenham, TX
SWR Nos. 82313 & 30897
TNRCC Photographs

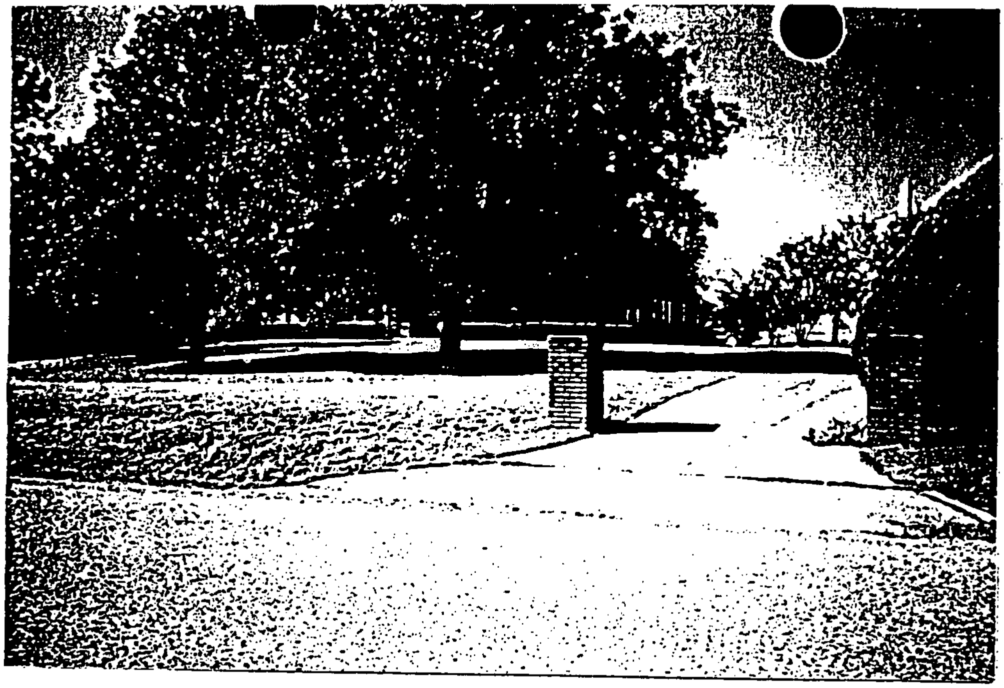
32. This view overlooks the closed hazardous waste landfill towards Highway 36. Direction is facing east. Photograph was taken on November 15, 1995.



33. The south end of the closed hazardous waste landfill, looking to the northwest, is viewed here. Note the lack of signs on the gate to deter unauthorized entry and the trees lining the creek adjacent to the landfill. Photo was taken on 11-15-95.



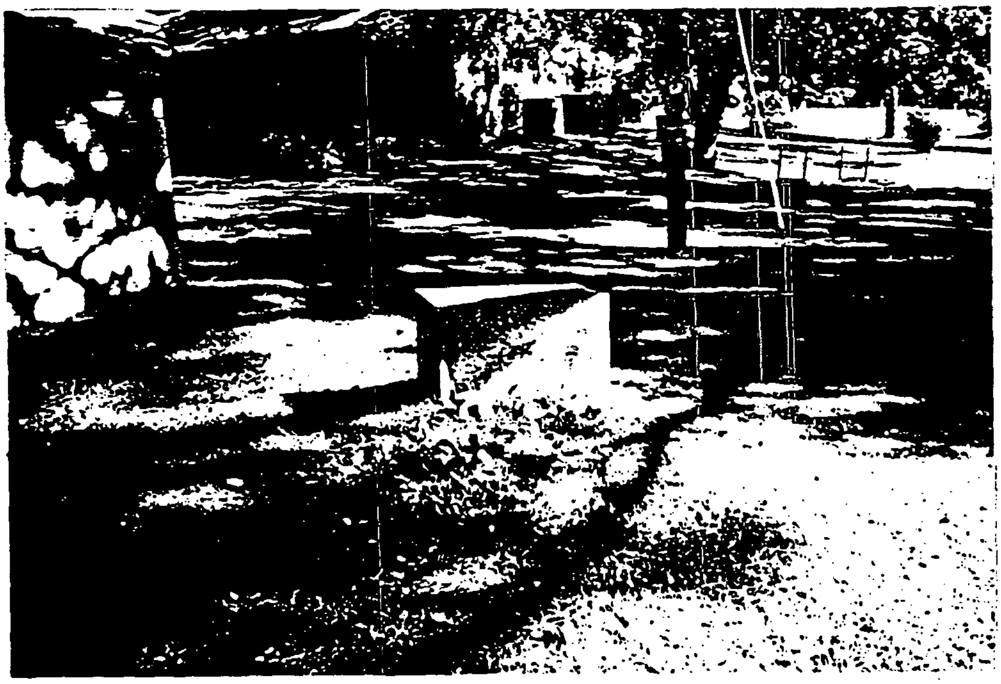
34. The S.W. corner of the closed hazardous waste landfill is viewed here. Note the tall vegetation around and on the landfill. Direction is facing northeast. Photo was taken on 11-15-95.



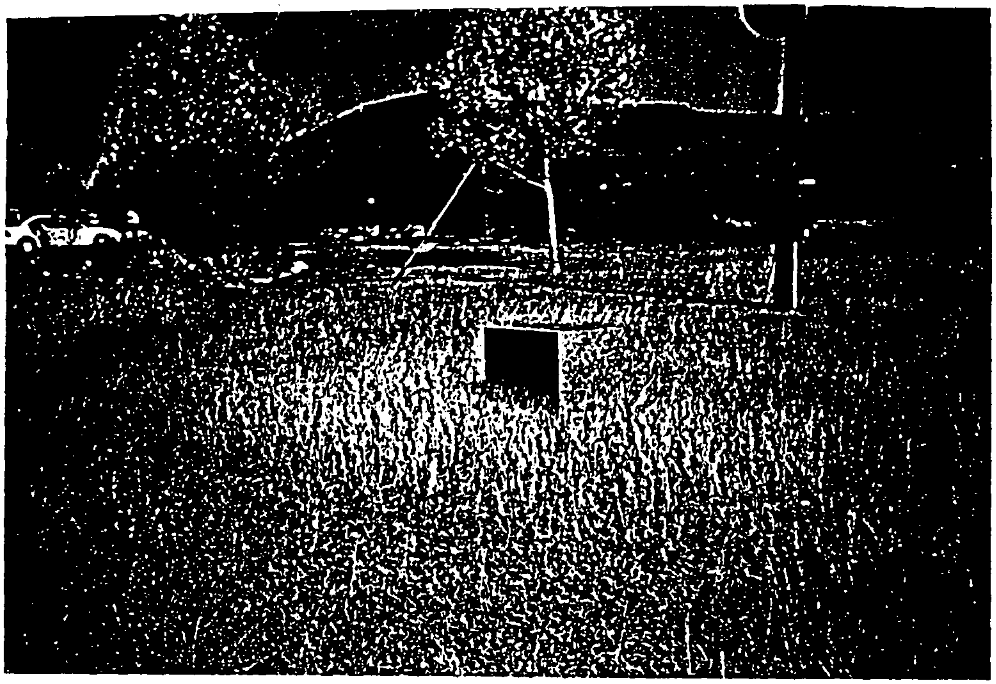
35. The front of the Faske residence at Box 6034, Route 6, Brenham, Texas is shown here. Photograph was taken on November 15, 1995.

36. The water well and outer casing at the Faske residence are shown here in the backyard. Photograph was taken on November 15, 1995.

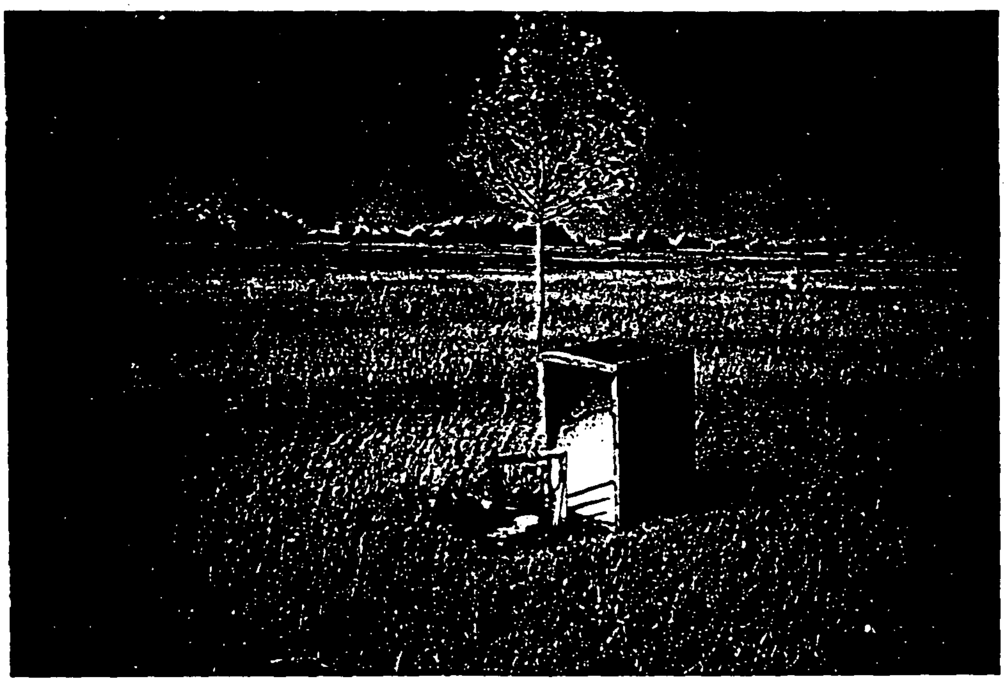
37. The faucet to the holding tank and the building that houses the holding tank are shown here at the Faske residence. Photograph was taken on November 15, 1995.



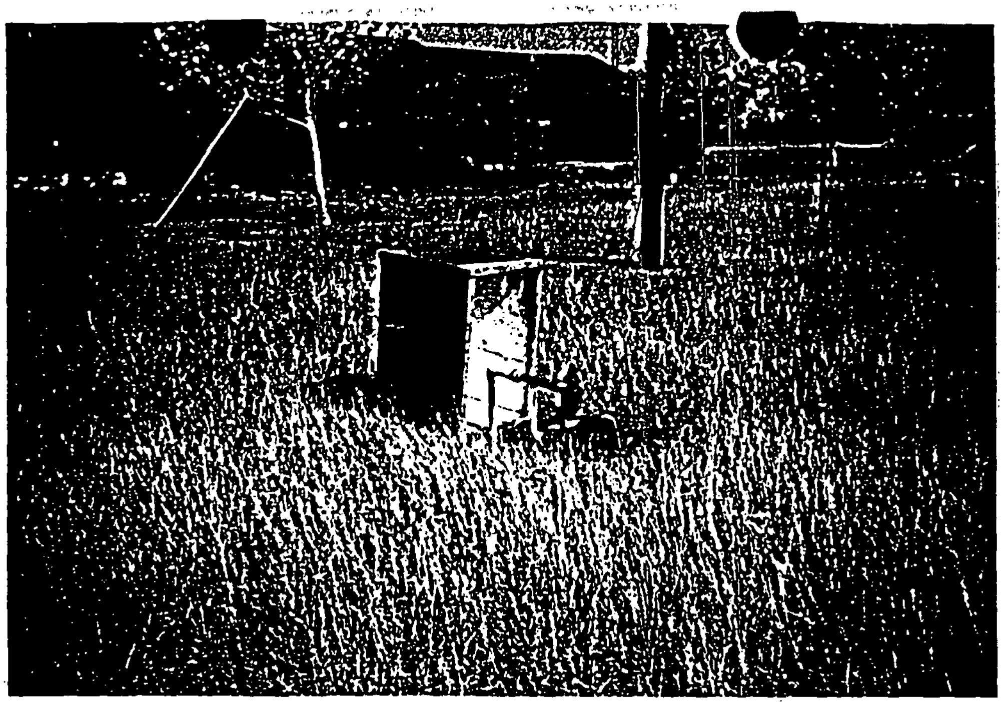
38. The outer casing of the water well and the building that houses the holding tank are shown here at the Faske residence. Photograph was taken on November 15, 1995.



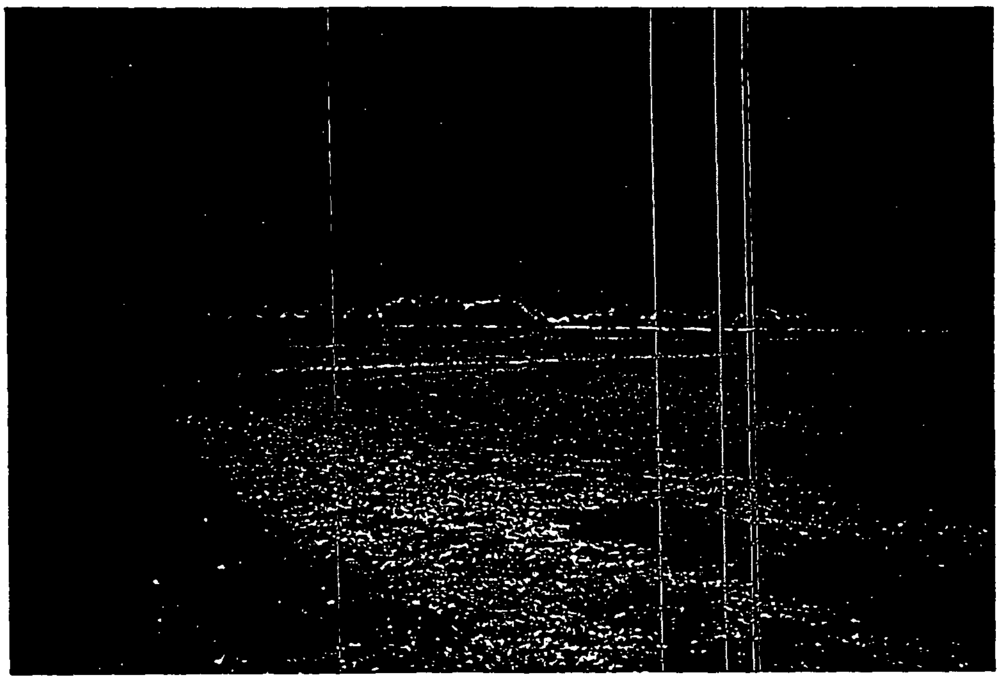
39. The Blum residence at Box 6033, Route 6, Brenham, Texas and outer casing of the water well are shown here. Photograph was taken on November 15, 1995.



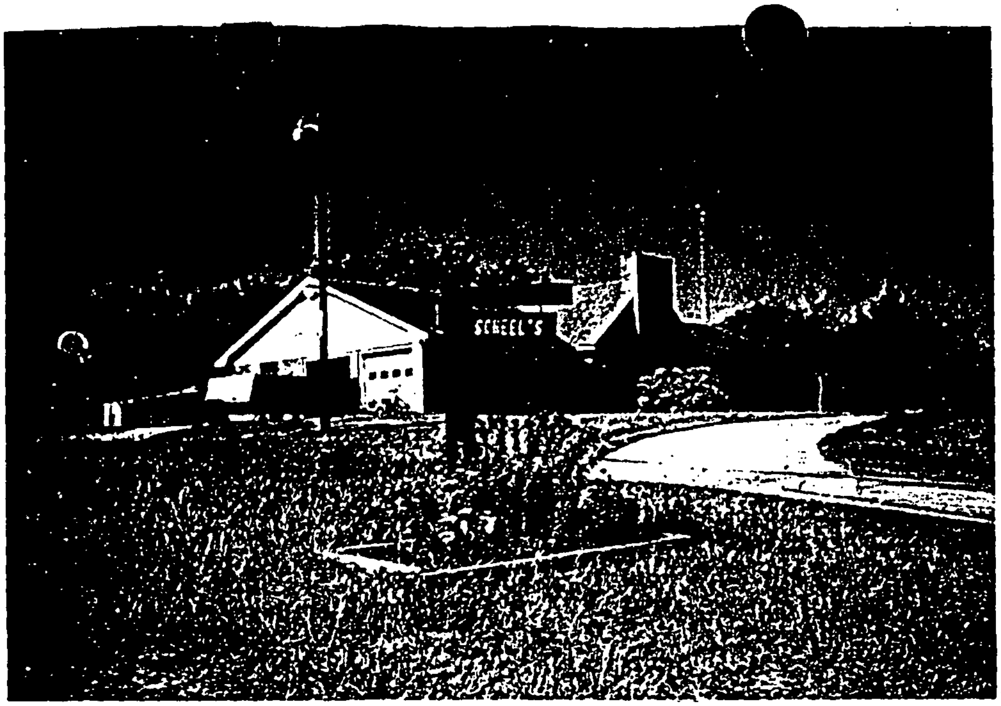
40. The outer casing and water well at the Blum residence are shown in the foreground. Note the white Retek building directly behind the well in the background. Photograph was taken on November 15, 1995.



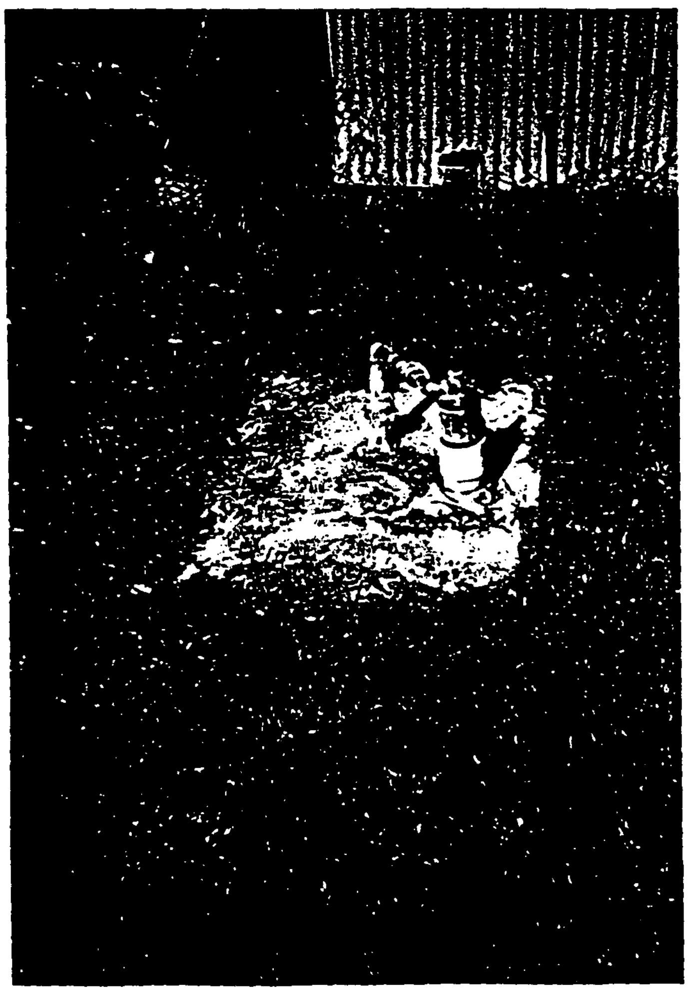
41. The outer casing and water well at the Blum residence are shown in the foreground. The house is in the background. Photograph was taken on November 15, 1995.



42. The driveway to the Blum house is shown in the foreground and the white Retek building is in the background. Photograph was taken on November 15, 1995.



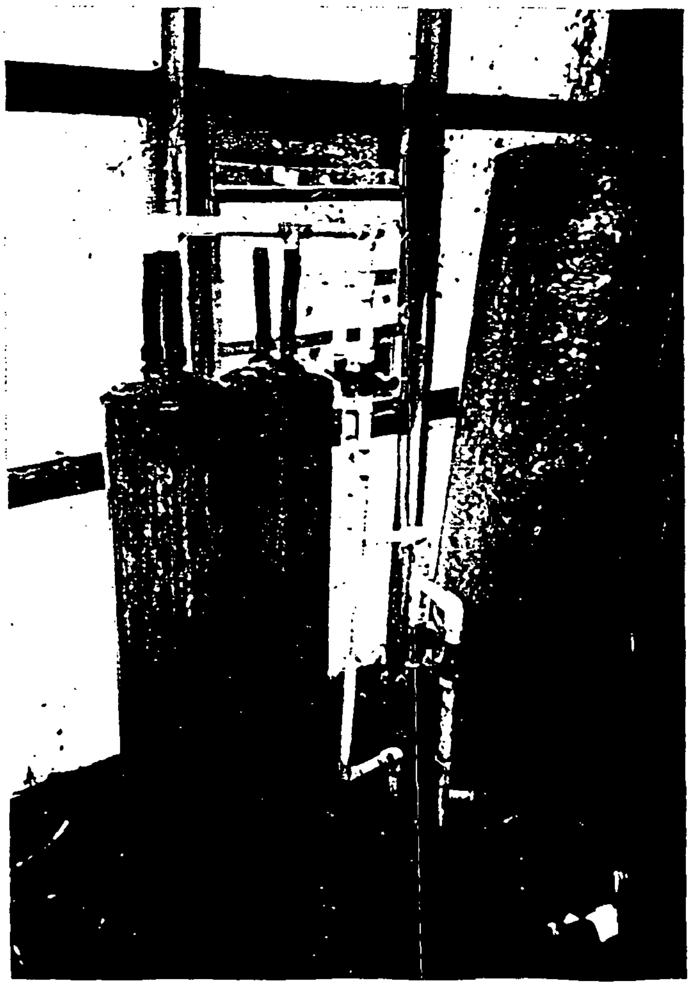
43. The front driveway of the Scheel residence at Box 6040, Route 6, Brenham, Texas is shown here. Photograph was taken on November 15, 1995.



44. The water well in the backyard of the Scheel residence is shown here. Photograph was taken on November 15, 1995.

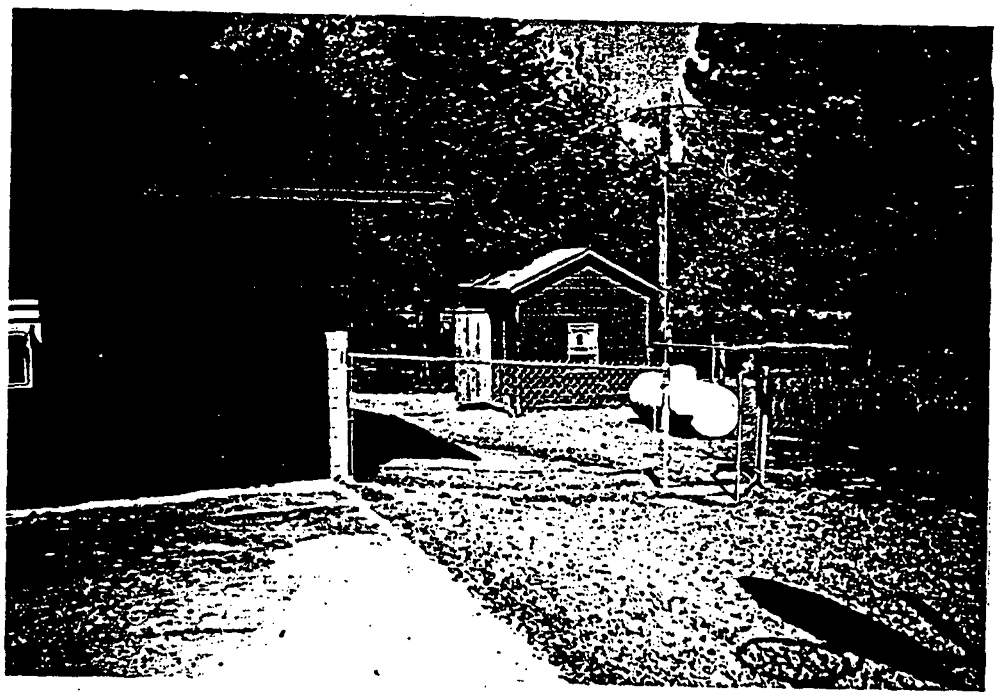
[redacted] No[redacted]823[redacted] & [redacted]0097
TNRCC Photographs

45. The water well and the building that houses the holding tank in the backyard are shown here at the Scheel residence. Photograph was taken on November 15, 1995.



46. The holding tank on the right and water softener cylinders at left are shown here at the Scheel residence. Photograph was taken on November 15, 1995.

47. The front of the Krueger residence at Box 6050, Route 6, Brenham, Texas is shown here. Photograph was taken on November 15, 1995.



48. The small building that houses the holding tank at the Krueger residence is shown here. Photograph was taken on November 15, 1995.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE : 08/29/88

SUBJECT : Potential Hazardous Waste Site

Ed Sierra for:

FROM : Dave Wineman, FIT RPM
Hazardous Waste Section (6E-SH)

TO : Presley B. Hatcher, Acting Chief
Site Assessment Section (6H-ES)

Site Name : Old Brazos Forge Inc

Location : Brenham / Washington / TX

EPA ID No : TXD 048 901 235

TDD No : F06 8804 35

A. Deliverables :

1. Preliminary Assessment attached( )
2. Site Inspection Report attached( )
3. Sampling Inspection Report attached( )
4. HRS Package
   Preliminary attached(✓)
   Final attached( )
   Support Documents attached( )
5. Other ________ attached( )

B. Were Drinking Water Wells sampled? Yes( ) No( )

C. Analytical Data :

1. None collected ( )
2. Field Data ( )
3. CLP Data ( )
4. Houston Lab Data ( )

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COMMENTS:

Sm= 31.46

cc: (circle) Cabra 6W-S
Gazda 6E-E
Taylor 6H-CE

Surface Water Route Sheet

Rating Factor	Assigned Value (Circle One)	Multiplier	Score	Max. Score	Ref. Section
[1] Observed Release	0 45	1	45	45	4.1
If observed release is given a score of 45, proceed to line [4]. If observed release is given a score of 0, proceed to line [2].					
[2] Route Characteristics					4.2
Facility Slope and Intervening Terrain	0 1 2 3	1		3	
1-yr. 24-hr. Rainfall	0 1 2 3	3		3	
Distance to Nearest Surface Water	0 1 2 3	4		6	
Physical State	0 1 2 3	3		3	
	Total Route Characteristics Score			15	
[3] Containment	0 1 2 3	1		3	4.3
[4] Waste Characteristics					4.4
Toxicity/Persistence	0 3 6 9 12 15 18	1	18	18	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1	8	8	
	Total Waste Characteristics Score		26	26	
[5] Targets					4.5
Surface Water Use	0 1 2 3	3	6	9	
Distance to a Sensitive Environment	0 1 2 3	2	0	6	
Population Served/ Distance to Water Intake Downstream	0 4 6 8 10 12 16 18 20 24 30 32 35 40	1	0	40	
	Total Targets Score		6	55	
[6] If line [1] is 45, multiply [1] x [4] x [5] If line [1] is 0, multiply [2] x [3] x [4] x [5]			7,020	64,350	
[7] Divide line [6] by 64,350 and multiply by 100 S_{sw} = 10.90					

FIGURE 7
SURFACE WATER ROUTE WORK SHEET

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Air Route Work Sheet

Rating Factor	Assigned Value (Circle One)	Multi-plier	Score	Max. Score	Ref. Section
[1] Observed Release	0 45	1	0	45	5.1
Date and Location:					
Sampling Protocol:					
If line [1] is 0, the Sa = 0, Enter on line [5]. If line [1] is 45, then proceed to line [2].					
[2] Waste Characteristics					5.2
Reactivity and Incompatibility	0 1 2 3	1		3	
Toxicity	0 1 2 3	3		9	
Hazardous Waste Quantity	0 1 2 3 4 5 6 7 8	1		8	
	Total Route Characteristics Score			20	
[3] Targets					5.3
Population Within 4-Mile Radius	0 9 12 15 18 21 24 27 30	1		30	
Distance to Sensitive Environment	0 1 2 3	2		6	
Land Use	0 1 2 3	1		3	
	Total Targets Score			39	
[4] Multiply [1] x [2] x [3]				35,100	
[5] Divide line [4] by 35,100 and multiply by 100 S_a = 0					

FIGURE 9
AIR ROUTE WORK SHEET

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	S	S^2
Groundwater Route Score (S_{gw})	53.33	2844.09
Surface Water Route Score (S_{sw})	10.9	118.81
Air Route Score (S_a)	0	0
$S_{gw}^2 + S_{sw}^2 + S_a^2$		2962.9
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2}$		54.43
$\sqrt{S_{gw}^2 + S_{sw}^2 + S_a^2} / 1.73 = S_M =$		31.46

FIGURE 10
WORKSHEET FOR COMPUTING S_M

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December 17, 1982

DOCUMENTATION RECORDS
FOR
HAZARD RANKING SYSTEM

INSTRUCTIONS: The purpose of these records is to provide a convenient way to prepare an auditable record of the data and documentation used to apply the Hazard Ranking System to a given facility. As briefly as possible summarize the information you used to assign the score for each factor (e.g., "Waste quantity = 4,230 drums plus 800 cubic yards of sludges"). The source of information should be provided for each entry and should be a bibliographic-type reference that will make the document used for a given data point easier to find. Include the location of the document and consider appending a copy of the relevant page(s) for ease in review.

FACILITY NAME: Old Brazos Forge, Inc.

LOCATION: Brenham, Texas, Washington County

Lat: 30° 10' 58" N
Long: 96° 25' 05" W

GROUND WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected (5 maximum):

No observed release of contaminants has been documented. (Ref. 1, pg. 9)

Rationale for attributing the contaminants to the facility: N/A

HRS value = 0

2. ROUTE CHARACTERISTICS

<u>Depths to Aquifer of Concern</u>

Name/description of aquifer(s) of concern:

The Jasper aquifer provides the ground water supply within the study area. Jasper aquifer has alternating beds of sand and clay. This aquifer is located in the lower part of the Fleming Formation. The maximum thickness is approximately 1300 feet. The Jasper Formation outcrops in the study area with a thickness of approximately 800 feet, but thickens to 1300 ft. downdip. The Jasper yields moderate to large amounts of fresh to slightly saline water and is the most highly developed hydrologic unit in the county. Its unconformity overlies the Catahaula Sandstone (Ref. 3, pg. 10 and 17).

Depth(s) from the ground surface to the highest seasonal level of the saturated zone [water table(s)] of the aquifer of concern:

Depths from the ground surface to the highest seasonal level of the saturated zone of the aquifer of concern vary approximately from 73 ft. to 494 ft. for the Jasper aquifer (Ref. 3, pg. 62 and 65).
Depth from the ground surface to the lowest point of waste disposal/storage:

The depth from the ground surface to the lowest point of waste disposal/storage (Ref. 4 -- site sketch).

Jasper aquifer 73 ft. - 6 ft. = 67 ft.

HRS value = 2

Net Precipitation

Mean annual or seasonal precipitation (list months for seasonal):

Mean annual precipitation is 40 inches (Ref. 1, pg. 14 and Ref. 9).

Mean annual lake or seasonal evaporation (list months for seasonal):

Mean annual lake evaporation is 54 inches (Ref. 1, pg. 13).

Net precipitation (subtract the above figures):

Net precipitation is -14 inches.

  40 inches
- 54 inches
- 14 inches

HRS value = 0

Permeability of Unsaturated Zone

Soil type in unsaturated zone:

The soil type varies within three geological units (Alluvium, Goliad Sand and Fleming) in the unsaturated zone. The soil type is from red-brown to brown clay and silt in the alluvium. In the Goliad Sand, it is interbedded sand and clay and predominately clay in the Fleming Formation (Ref. 3, pg. 10).

Permeability associated with soil type:

The permeability associated with the soil mentioned above is between 10^{-5} to 10^{-7} cm/sec (Ref. 1, pg. 15).

HRS value = 1

Physical State

Physical state of substances at time of disposal (or at present time for generated gases):

Physical state of substances at time of disposal was liquid and solid (Ref. 5, pg. 2; Ref. 4, pg. 10; Ref. 10 and Ref. 12).

HRS value = 3

3. CONTAINMENT

Containment

Method(s) of waste or leachate containment evaluated:

The three surface impoundments (lagoons) are purported to have a natural liner (bentonite), but no leachate collection and removal system (Ref. 4, pg. 4 -- Group II and Ref. 5, pg. 1 and 2).

Method with highest score:

Unsound run-on diversion structure; no liner, or incompatible liner (Ref. 1, pg. 17).

Note: The containment information was found from a file search. The liner could be incompatible, but until a site inspection, it is difficult to actually assess the containment value for ground water route. A value of 3 will tentatively be used until further information in the area is found.

HRS value = 3

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

The following compounds were found on site: Lead (Pb), Nickel (Ni), Zinc (Zn), Chromium (Cr), Copper (Cu) and Cyanide (CN) (Ref. 6, pg. 4; Ref. 10 and Ref. 12, pg. 4).

Compound with highest score:

Lead (Pb), Nickel (Ni), Zinc (Zn), Chromium (Cr), Copper (Cu) and cyanide (CN) (Ref. 1, pg. 18).

HRS value = 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Expected total quantity of waste to be generated each year is approximately 21,684,000 lbs. However, only an estimated small percentage will be considered to be hazardous waste (Ref. 4, pg. 10).

Basis of estimating and/or computing waste quantity:

Estimation: Assume .5% to be hazardous waste. The small percentage was a conservative estimate since a site inspection was not conducted.

```
  21,684,000 lbs.
  x     .005
 108,420.000 lbs. converted to tons ÷ 2000 = 54,210 tons
 (Ref. 4, pg. 10)
```

HRS value = 8

5. TARGETS

<u>Ground Water Use</u>

Use(s) of aquifer(s) of concern within a 3-mile radius of the facility:

There are three public water supplies (listed below) that use the aquifer of concern for drinking water, but have no municipal water from alternate unthreatened sources presently available. The City of Brenham uses 3 city wells (nos.11, 12 and 13 for drinking water) only in an emergency, but has an alternate unthreatened source presently available at Lake Somerville, approximately 10 miles from the site. There is an on-site well, but its use is not known. It may be utilized as an industrial well (Ref. 3, Ref. 7 and Ref. 14).

HRS value = 3

<u>Distance to Nearest Well</u>

Location of nearest well drawing from <u>aquifer of concern</u> or occupied building not served by a public water supply:

The nearest well is an on-site well (a State observation well# yy 59-53-501)(Ref. 5, pg. 3 and Ref. 14). (SEE ABOVE)

Distance to above well or building:

The distance is assumed to be <2000 ft. since the exact dimensions of site boundary cannot be determined from the file search (Ref. 2).

HRS value = 4

Population Served by Ground Water Wells Within a 3-Mile Radius

Identified water-supply well(s) drawing from aquifer(s) of concern within a 3-mile radius and populations served by each:

	Public Water Supply Wells	Population Served
1)	Large Water Company....................	60
2)	Oak Hill Acres..........................	400
3)	Bowlarama of Brenham and Coachlight West Inn...............................	100
4-6)	City of Brenham Well# 11-13............	11,000 (Ref. 7)

Computation of land area irrigated by supply well(s) drawing from aquifer(s) of concern within a 3-mile radius, and conversion to population (1.5 people per acre):

There is no irrigation supplied by supply wells drawing from aquifer of concern (Ref. 8).

Total population served by ground water within a 3-mile radius:

The population served by groundwater within a 3-mile radius is approximately 13,470. This was determined from the figures listed below:

Brenham water supplies serves approximately 11,000 (City Water Wells are only used in an emergency such as pipe leakage or maintenance problems). Population other than Brenham is 2,470 [Figured the population by counting houses (650) and then multiplied by 3.8/household]. (Ref. 2; Ref. 9, pg. 1 and Ref. 11).

HRS value = 40

SURFACE WATER ROUTE

1. OBSERVED RELEASE

Contaminants detected in surface water at the facility or downhill from it (5 maximum):

The contaminants were lead (Pb), nickel (Ni), zinc (zn), chromium (Cr) and copper (Cu) (Ref. 10 and 13)*
Note: This will be a tentative score until site inspection to confirm the state sample locations (December 12, 1986 and October 9, 1984).

Rationale for attributing the contaminants to the facility:

State sampling inspections (December 12, 1986 and October 9, 1984) of a tributary to Little Sandy Creek and of the facility showed contaminants in the surface water route.

Texas Water Commission Report (dated May 27, 1987) by Paula Thetford, Hazardous and Solid Waste Specialist, and a letter from Eddie Abshire, Water Quality Manager for the Texas Water Commission to Larry Landry, FIT Chemist (Ref. 10, Ref. 13, Ref. 16 and Attachments 1 and 2).

HRS value = 45

2. ROUTE CHARACTERISTICS

Facility Slope and Intervening Terrain

Average slope of facility in percent:

Range of elevation of facility (340 ft. - 320 ft.)

% slope $\frac{340 \text{ ft.} - 320 \text{ ft.}}{1000 \text{ ft.}}$ = .02 x 100 = 2% slope (Ref. 2).

Name/description of nearest downslope surface water:

The nearest downslope surface water is an unnamed tributary to Little Sandy Creek (Ref. 2 and Ref. 13).

Average slope of terrain between facility and above-cited surface water body in percent:

$\frac{345 \text{ ft.} - 270 \text{ ft.}}{2{,}500 \text{ ft.}} = \frac{75 \text{ ft.}}{2{,}500 \text{ ft.}} = .03 \times 100 = 3\%$ (Ref. 2)

HRS value = 1

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Is the facility located either totally or partially in surface water?

No, the facility is not located either totally or partially in surface water (Ref. 2).

Is the facility completely surrounded by areas of higher elevation?

No, the facility is not completely surrounded by areas of higher elevation (Ref. 2).

<u>1-Year 24-Hour Rainfall in Inches</u>

3.5" (Ref. 1)

HRS value = 3

<u>Distance to Nearest Downslope Surface Water</u>

The distance to nearest downslope surface water is approximately 2,500 ft. to an unnamed tributary of Little Sandy Creek (Ref. 2 and Ref. 13).

HRS value = 2

<u>Physical State of Waste</u>

The physical state of substances at time of disposal was liquid and solid (Ref. 5, pg. 2; Ref. 4, pg. 10; Ref. 10 and Ref. 12).

HRS value = 3

3. CONTAINMENT

<u>Containment</u>

Method(s) of waste or leachate containment evaluated:

The three surface impoundments (lagoons) are documented to be of natural earth (bentonite), but no leachate collection and removal system. (Ref. 4, pg 3 of 2 of Group II and pg. 4, Ref 5, Ref 10, and Ref. 13).

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Method with highest score:*

Diking, unsound leaking, or in danger of collapse (Ref. 1, Pg. 35).

HRS value = Default value 3

*Note: The containment information was found from a file search. The dike and freeboard information was obtained from a RCRA inspection (February 1982) done by the Texas Water Commission. It is difficult of assess from a file search, but an HRS value of 3 was used since the State documented an observed release of contaminants into a tributary from 2 sampling inspections.

4. WASTE CHARACTERISTICS

Toxicity and Persistence

Compound(s) evaluated:

Lead (Pb), Nickel (Ni), Zinc (Zn), Chromium (Cr), Copper (Cu) and Cyanide (CN) (Ref. 6, pg. 4, Ref. 10 and Ref. 12)

Compound with highest score:

Lead (Pb), Nickel (Ni), Zinc (Zn), Chromium (Cr), Copper (Cu) and Cyanide (CN)

HRS value = 18

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility, excluding those with a containment score of 0 (Give a reasonable estimate even if quantity is above maximum):

Expected quantity of waste to be generated each year is approximately 21,684,000 lbs. However, only an estimated small percentage will be considered to be hazardous waste (Ref. 4, pg. 10).

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Basis of estimating and/or computing waste quantity:

Estimation: .5%* to be hazardous waste.

$$\begin{array}{r} 21{,}684{,}000 \\ \underline{x \qquad .005} \\ 108{,}420{,}000 \end{array}$$ lbs. ÷ 2,000 = <u>54,210 tons</u>

*This amount was a conservative estimate. This score will be tentative until a site inspection is conducted and this gap filled in with the appropriate percentage (Ref. 4, pg. 10).

HRS value = 8

5. TARGETS

<u>Surface Water Use</u>

Use(s) of surface water within 3 miles downstream of the hazardous substance:

The only use would be fishing, but this is seasonal since the creeks could dry up in the summer (Ref 8 and Ref. 15).

HRS value = 2

Is there tidal influence?

No (Ref. 2)

<u>Distance to a Sensitive Environment</u>

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

None (Ref. 8)

HRS value = 0

Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

None (Ref. 8).

HRS value = 0

Distance to critical habitat of an endangered species or national wildlife refuge, if 1 mile or less:

No endangered species (Ref. 8).

HRS value = 0

Population Served by Surface Water

Location(s) of water-supply intake(s) within 3 miles (free-flowing bodies) or 1 mile (static water bodies) downstream of the hazardous substance and population served by each intake:

None (Ref. 8 and Ref. 11).

HRS value = 0

Computation of land area irrigated by above-cited intake(s) and conversion to population (1.5 people per acre):

N/A

Total population served:

N/A

Name/description of nearest of above water bodies:

N/A

Distance to above-cited intakes, measured in stream miles.

N/A

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1. OBSERVED RELEASE

Contaminants detected:

N/A

Date and location of detection of contaminants:

N/A

Methods used to detect the contaminants:

N/A

Rationale for attributing the contaminants to the site:

N/A

2. WASTE CHARACTERISTICS

Reactivity and Incompatibility

Most reactive compound:

Most incompatible pair of compounds:

Toxicity

Most toxic compound:

Hazardous Waste Quantity

Total quantity of hazardous waste:

Basis of estimating and/or computing waste quantity:

3. TARGETS

Population Within 4-Mile Radius

Circle radius used, give population, and indicate how determined:

0 to 4 mi   0 to 1 mi   0 to 1/2 mi   0 to 1/4 mi

Distance to a Sensitive Environment

Distance to 5-acre (minimum) coastal wetland, if 2 miles or less:

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Distance to 5-acre (minimum) fresh-water wetland, if 1 mile or less:

Distance to critical habitat of an endangered species, if 1 mile or less:

Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within the view of the site?

FIRE AND EXPLOSION

1. CONTAINMENT

Hazardous substances present:

Type of containment, if applicable:

2. WASTE CHARACTERISTICS

Direct Evidence

Type of instrument and measurements:

Ignitability

Compound used:

Reactivity

Most reactive compound:

Incompatibility

Most incompatible pair of compounds:

Hazardous Waste Quantity

Total quantity of hazardous substances at the facility:

Basis of estimating and/or computing waste quantity:

3 TARGETS

Distance to Nearest Population

Distance to Nearest Building

Distance to Sensitive Environment

Distance to wetlands:

Distance to critical habitat:

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Land Use

Distance to commercial/industrial area, if 1 mile or less:

Distance to national or state park, forest, or wildlife reserve, if 2 miles or less:

Distance to residential area, if 2 miles or less:

Distance to agricultural land in production within past 5 years, if 1 mile or less:

Distance to prime agricultural land in production within past 5 years, if 2 miles or less:

Is a historic or landmark site (National Register or Historic Places and National Natural Landmarks) within view of the site?

Population Within 2-Mile Radius

Buildings Within 2-Mile Radius

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DIRECT CONTACT

1. OBSERVED INCIDENT

Date, location, and pertinent details of incident:

2. ACCESSIBILITY

Describe type of barrier(s):

3. CONTAINMENT

Type of containment, if applicable:

4. WASTE CHARACTERISTICS

<u>Toxicity</u>

Compounds evaluated:

Compound with highest score:

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5. TARGETS

Population within one-mile radius

Distance to critical habitat (of endangered species)

ATTACHMENT I

Analysis from Sampling Inspection
(December 12, 1986) Done by the Texas Water Commission

Contaminants	BG	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Pb (Total)	50	76	81	37	71	66	37	49
Pb (EP-tox)	.032	<.01	<.01	<.01	<.01	.036	.042	<.01w
Pb (TDWR)	<.01	.053	<.01	.087	<.01	.01	<.01	<.01
Cr (total)	24	122*	54	124*	800*	1310	58,000*	88*
Cr (EP-tox)	.008	.024	.008	.026	.048	.05	.064	.016
Cr (TDWR)	<.008	.031	.021	.014	.141	.088	.043	.04
Ni (total)	16	323*	111*	206*	970*	4470*	98*	830*
Zn (total)	32	107*	39	28	67*	145*	419*	396*
Cu (total)	<.1	48*	5	32*	144*	507*	75*	58*

BG = background
S-1 = at outfall
S-2 = 50 feet downstream from outfall
S-3 = 100 feet downstream from outfall
S-4 = 150 feet downstream from outfall
S-5 = 200 feet downstream from outfall
S-6 = 250 feet downstream from discharge at Hwy 36
S-7 = near driveway downslope from sludge bin

All data shown in ppm
*Significantly higher than background

ATTACHMENT II

ANALYSIS FROM SAMPLING INSPECTION OCTOBER 9, 1984
Compiled by the Texas Water Commission

Contaminants	Background		Station# 2		Station# 3		Station# 4			Station# 414	Station# 5	Station# 6	
	S	8"	S	8"	S	8"	Trib.	S	8"	S	S	S	8"
Cadmium (Cd) (mg/kg)	20.2	0.2									2.0		
Lead (Pb) (mg/kg)	21.0	55	63	50	30					600			
Nickle (Ni) (mg/kg)	290	515	970	126	2120		14,000	24,050	4190	42,200	6000	3240	
Zinc (Zn) (mg/kg)	115	70	560	84	486	214	11,800	1100	152	7900	102	1680	
Chromium (mg/kg)	61	126	670	114	530		7800	4450	950	6900	2830	2060	170
Chromium (cr^{+6} Leachate) (mg/kg)							1.98						
Copper (Cu) (mg/kg)	35	49	710	77	328	41	4000	3050	275	12,200	1420	1270	

HRS DOCUMENTATION LOG SHEET

REF. NO.
SITE NAME: Old Brzos Forge, Inc.
CITY & STATE: Brenham, Texas
IDENTIFICATION NUMBER: TXD048901235

REF NUM	DESCRIPTION OF THE REFERENCE
01	Uncontrolled Hazardous Waste Site Ranking System. A User's Manual.
	47FR31219 - 31243, 16 July 1982.
02	Topographic Map: 7.5' Quadrangles. Brenham, Texas (1963) and
	Chappel Hill (1963).
03	Texas Water Development Board - Report 162. Groundwater Resources of
	Washington County, TX. Reprinted Jan. 1983.
04	Texas Department of Water Resources - Industrial Solid Waste Disposal
	Compliance Monitoring Inspection (Feb. 10, 1982) by Robert J. Bresset,
	Field Representative.
05	Letter (April 26, 1982) to Harvey Davis, Executive Director, Texas
	Department of Water Resources, Austin, TX 78711, from Lamar Green
	(previous Old Brazos Forge, Inc., contractor) Beaumont, TX 77704.
06	Texas Department of Water Resources - Interoffice Memorandum
	(November 10, 1988) from Robert J. Bressent, To: Files, Subject:
	Sampling Points and Analysis re: Old Brazos Forge, Reg.# 30897.
07	Klandrud, Len. Information About Public Water Supplies Within 3 mile
	radius of the site. Texas Department of Health, Temple,
	Texas 76504-7168.
08	ROC, From: Kermit A. Wahrmund, District Conservationist, Brenham,
	Texas, To: Larry Landry, FIT Chemist, EPA Region VI
09	Brenham - Community Data Profile. County: Washington; State: Texas
	Prepared by: Texas Department of Commerce. Print Date:03/10/88
	Last Update: 6/08/87.
10	Texas Water Commission - Interoffice Memorandum (May 27, 1987) from
	Paula Thetford, Hazardous and Solid Waste Specialist, Southeast Region,
	Deer Park Office. To: Luis Campos, Field Operations Liaison Field

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HRS DOCUMENTATION LOG SHEET

REF. NO.
SITE NAME: Old Brazos Forge, Inc.
CITY & STATE: Brenham, TX
IDENTIFICATION NUMBER: TXD048901235

REF NUM	DESCRIPTION OF THE REFERENCE
10	Contd. - Operations Division.
11	ROC: From Larry K. Landry, FIT Chemist, EPA Region VI. To: Alphouse
	Kubeczka, Water Production Manager, Brenham, Texas.
12	RCRA Notifier from Old Brazos Forge, Inc. (June 10, 1981).
13	Letter from Eddie E. Abshire, Texas Water Commission. To: Larry K.
	Landry, FIT Chemist. EPA Region VI.
14	Well Information Supplied by Texas Natural Resources Information
	System - Emil Blomquist, P.O. Box 13321, Austin, TX 78711-3231
15	ROC: From Larry K. Landry, FIT Chemist, EPA Region VI. To: Bill Thane,
	County Extension Agent, Washington Court House, Brenham, TX 77833.
16	ROC, From: Larry Landry, FIT Chemist, EPA Region VI. To: Paula
	Thetford; Field Investigator, Texas Water Commission.

REFERENCES

If the entire reference is not available for public review in the EPA regional files on this site, indicate where the reference may be found:

Reference Number	Description of the Reference
1	Uncontrolled Hazardous Waste Site Ranking System: A Users Manual. 47 FR 31219-31243, 16 July 1982 (Appendix A, CERCLA).

Ret. 3

TEXAS
WATER
DEVELOPMENT
BOARD

Report 162

GROUND-WATER RESOURCES OF WASHINGTON COUNTY, TEXAS

November 1972

REPRINTED BY THE TEXAS DEPARTMENT OF WATER RESOURCES

JANUARY 1983

Table 2.—Physical Characteristics and Water-Bearing Properties of the Hydrologic Units

SYSTEM	SERIES		GEOLOGIC UNIT	HYDROLOGIC UNIT	MAXIMUM THICKNESS (FT)	GENERAL COMPOSITION	WATER-BEARING PROPERTIES AND DISTRIBUTION OF SUPPLY
Quaternary	Holocene Pleistocene		Alluvium	Alluvium of the Brazos River	75	Red-brown to brown clay and silt; commonly overlying lighter-colored fine to coarse sand and gravel. Present beneath the flood plain of the Brazos River; in places forms isolated terraces.	Yields small to large amounts of fresh water to wells on the flood plain of the Brazos River.
Tertiary	Pliocene		Goliad Sand	Evangeline aquifer	550	Interbedded sand and clay; in places black chert grains in whitish sand give a salt and pepper effect.	Yields moderate amounts of fresh water.
	Miocene		Fleming Formation	Burkeville aquiclude	200	Predominately clay; contains some thin beds of sand.	Yields small amounts of fresh water.
				Jasper aquifer	1,300	Alternating beds of sand and clay, includes massive beds of gray to brown sand interbedded with gray clay.	Yields moderate to large amounts of fresh to slightly saline water.
			Catahoula Sandstone	Catahoula Sandstone	800	Alternating beds of gray clay, tuff, and sandstone. Lower sandstones may be hard, white, and opaline.	Yields small to moderate amounts of fresh water.
	Eocene		Jackson Group	Jackson Group	1,400	Predominately a terrestial shale; contains clay, volcanic ash, sandstone, and limestone.	Yields small to moderate amounts of water.
		Claiborne Group	Yegua Formation	Yegua Formation	1,300	Interbedded sand and carbonaceous clay, sandy clay, and silt; contains lignite and volcanic ash.	Not known to contain fresh to slightly saline water in Washington County.
			Cook Mountain Formation	Cook Mountain Formation	570	Predominately fossiliferous shale containing a 50-75 foot thick sand bed near the middle of the formation. Contains thin lenses of limestone, glauconitic sandstone and gypsum.	Not known to contain fresh or slightly saline water in Washington County.
			Sparta Sand	Sparta Sand	280	Fine to medium sand containing some brown lignitic shale. In places shale beds divide massive sand into an upper and lower unit.	Not known to yield water to wells in Washington County. May yield moderate amounts of slightly saline water in northwestern part of county.
			Weches Greensand	Weches Greensand	110	Predominately fossiliferous glauconitic shale; some sandstone and thin fossiliferous limestone.	Not known to contain fresh or slightly saline water in Washington County.
			Queen City Sand	Queen City Sand	500	Massive to thin-bedded, ferruginous and slightly lignitic sandstone interbedded with gray or brown, silty, lignitic shale.	Not known to yield water to wells in Washington County. May yield small amounts of slightly saline water.
			Reklaw Formation	Reklaw Formation	270 1/	Gray to brown shale in upper part and glauconitic sandstone interbedded with shale in lower part. The sandstone is fine- to coarse-grained and highly ferruginous.	Not known to contain fresh or slightly saline water in Washington County.
			Carrizo Sand	Carrizo Sand	465 1/	Massive, friable, commonly cross-bedded, well sorted, fine- to medium-grained, light-gray sandstone. Contains increasing amounts of shale downdip.	Not known to yield water to wells in Washington County. May yield small amounts of slightly saline water.

1/ In Lee County.

Catahoula Sandstone

The Catahoula Sandstone is a series of alternating beds of gray clay, tuff, and sandstone that unconformably overlie the Jackson Group. Sandstones in the lower part may be hard, white, and opaline.

The Catahoula crops out in a ½- to 4-mile-wide band in northern Washington County. Near the outcrop, the unit has a thickness of about 300 feet. In the southeastern part of the county, the thickness increases to a maximum of about 800 feet. The Catahoula is capable of yielding moderate amounts of fresh to slightly saline water to wells on the outcrop and in areas as much as 10 to 15 miles downdip.

Jasper Aquifer

The Jasper aquifer, which is equivalent to the lower part of the Fleming Formation of Miocene age (Table 2), is composed of alternating beds of sand and clay that unconformably overlie the Catahoula Sandstone. The unit includes massive, gray to brown, crossbedded sands interbedded with gray clay.

The Jasper crops out in the central part of the county (Figure 5). The thickness of the formation near the outcrop is about 800 feet, but it thickens rapidly down-dip and reaches a maximum thickness of about 1,300 feet near the Austin-Waller-Washington County line. The Jasper is capable of yielding moderate to large amounts of fresh to slightly saline water and is the most highly developed hydrologic unit in the county.

The approximate altitude of the base of the Jasper aquifer is shown on Figure 7. The dip averages about 80 feet a mile; but locally steepens to as much as 200 feet a mile.

Burkeville Aquiclude

The Burkeville aquiclude consists generally of a massive clay that overlies the Jasper and separates it from the Evangeline aquifer. In Washington County down-dip from the outcrop, it ranges in thickness from about 120 to 200 feet. Although basically a confining layer, the Burkeville contains some thin beds of sand which locally yield small amounts of fresh water.

Evangeline Aquifer

The Evangeline aquifer is a sequence of alternating clays and sands above the Burkeville aquiclude. In places, black chert grains in the whitish sands produce a salt and pepper effect. The Evangeline includes the upper part of the Fleming Formation of Miocene age and the alternating sands and clays of the Goliad Sand of Pliocene age. The Evangeline has a maximum thickness of approximately 550 feet in extreme southeastern Washington County, where the Evangeline yields moderate amounts of fresh water to wells. The approximate altitude of the base of the Evangeline is shown in Figure 6.

Alluvium of the Brazos River

Generally, the alluvial deposits are composed of red-brown to brown clay and silt, fine to coarse sand, and gravel. These sediments lense, interfinger, and grade laterally or vertically into finer or coarser materials. Normally, the finer grained materials predominate in the upper part of the alluvium; the coarser grained materials, such as gravel, occur in the lower part.

Alluvial deposits occur in Washington County as flood plain alluvium and terrace deposits (Cronin and Wilson, 1967). The terrace materials exist as remnants that cap hilltops or stand as isolated bodies above the flood plain. None of the terrace deposits are hydrologically significant in Washington County.

The flood plain alluvium, which consists of sand, gravel, silt, and clay, contains abundant fresh water. These deposits, which rest unconformably on the truncated surfaces of the older bedrock units, attain a maximum thickness of about 75 feet. In places, the alluvium contains extensive gravel beds that are 30 to 40 feet thick.

In addition to the alluvium deposited along the Brazos River, alluvium is also present along Yegua Creek, Jackson Creek, Red Gully, Caney Creek, and Mill Creek. The tributary stream alluvium is in hydrologic continuity with and thus is assigned to the alluvium of the Brazos River.

A more complete discussion of the alluvium of the Brazos River can be found in Cronin and Wilson (1967) and Cronin and others (1963).

GROUND-WATER HYDROLOGY

The general principles of ground-water hydrology as they apply to Washington County are discussed in this section of the report. For additional information, the reader is referred to: Baldwin and McGuinness (1963), Leopold and Langbein (1960), Meinzer (1923a, p. 2-142; 1923b), and Todd (1959, p. 14-114).

Source and Occurrence of Ground Water

Precipitation within the county and in adjoining areas to the north and northwest is the main source of groundwater in Washington County. Most precipitation runs off as streamflow; part is evaporated at the land surface, transpired by plants or retained by capillary

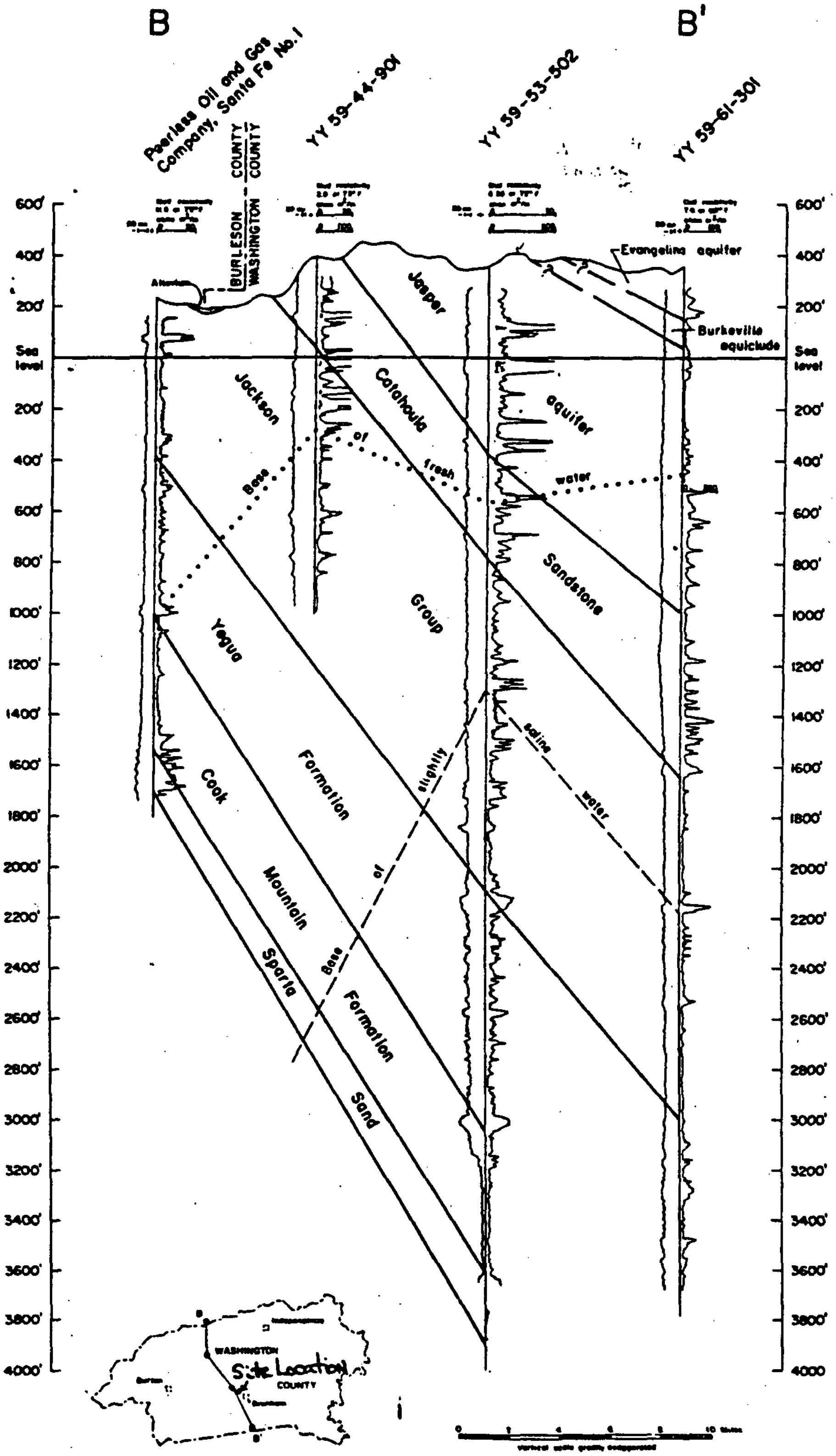


Figure 21
Geohydrologic Section B-B', Burleson and Washington Counties

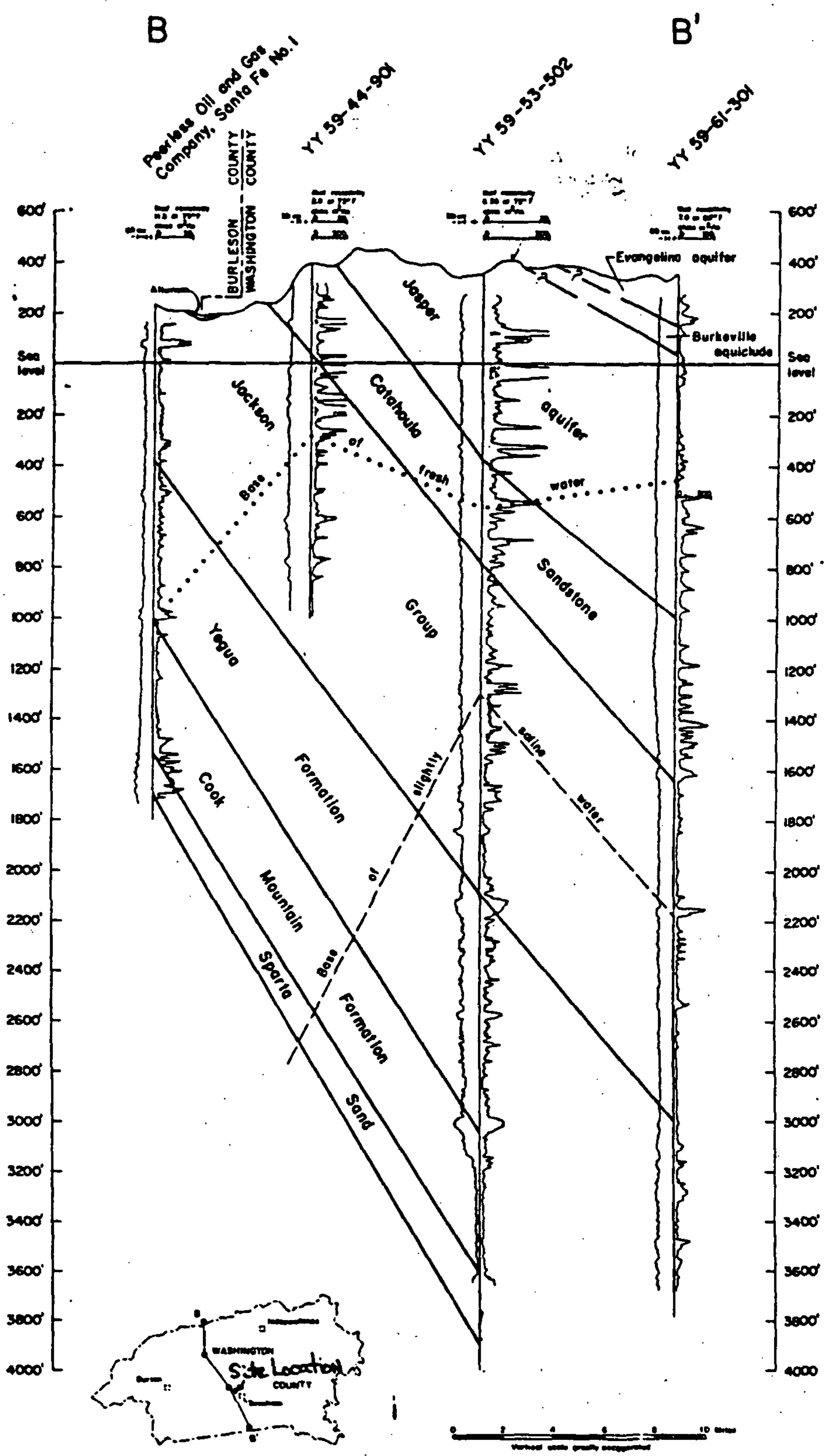


Figure 21
Geohydrologic Section B-B', Burleson and Washington Counties

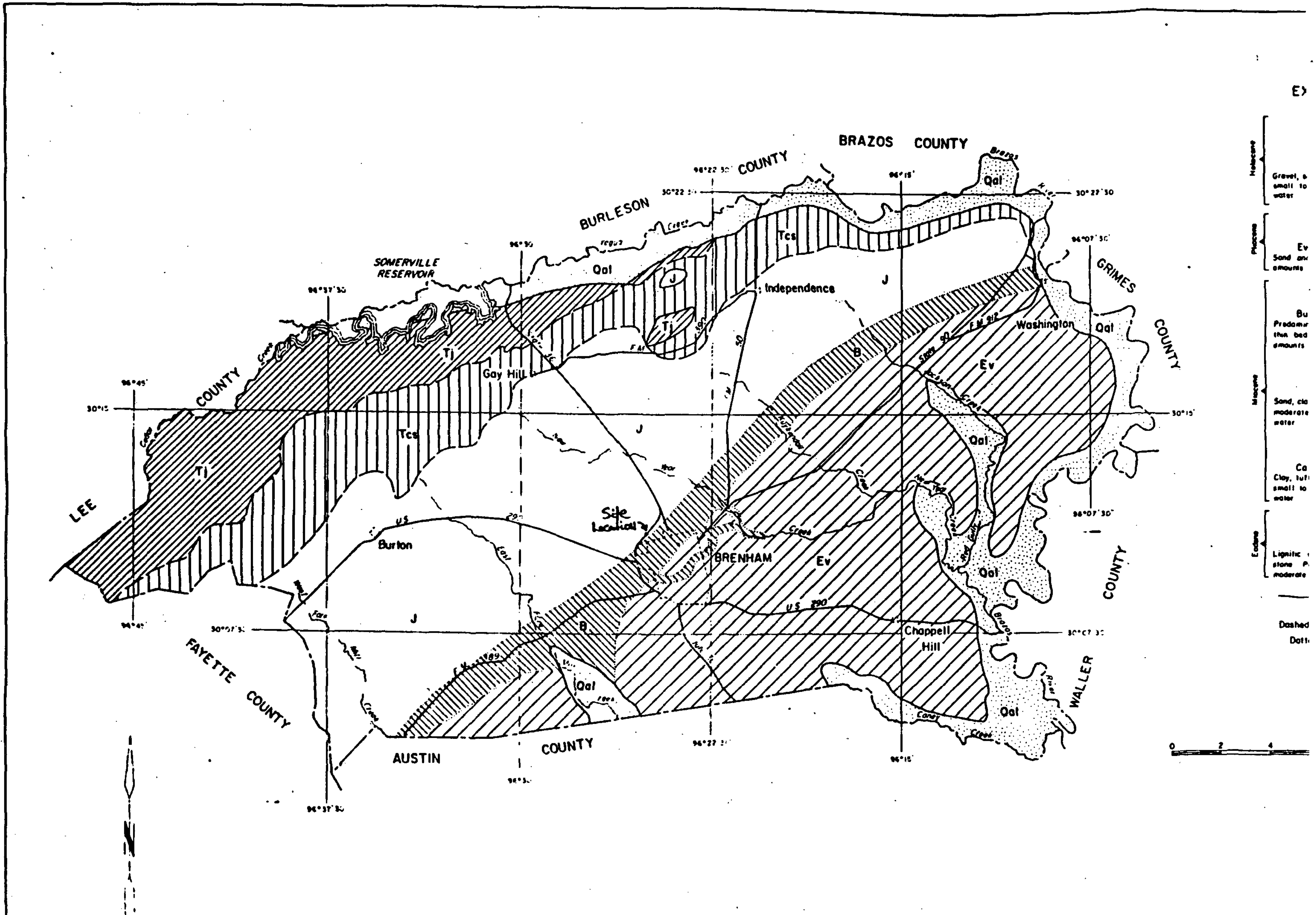


Figure 5
Outcrops of the Geologic and Hydrologic Units

Base from U.S. Geological Survey topographic quadrangles

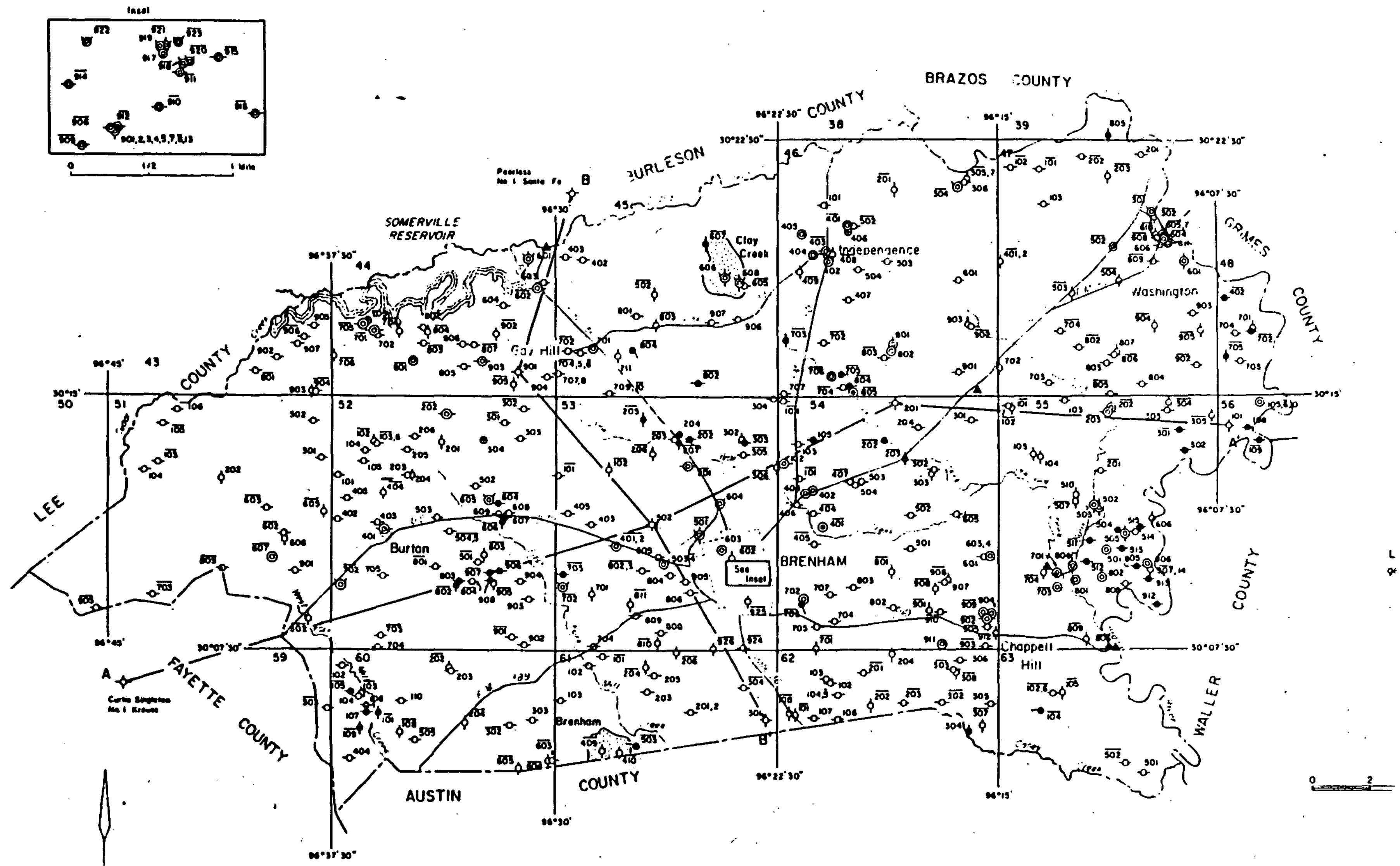


Figure 19
Locations of Wells, Spring and Test Holes

Base from U S Geological Survey topographic quadrangles

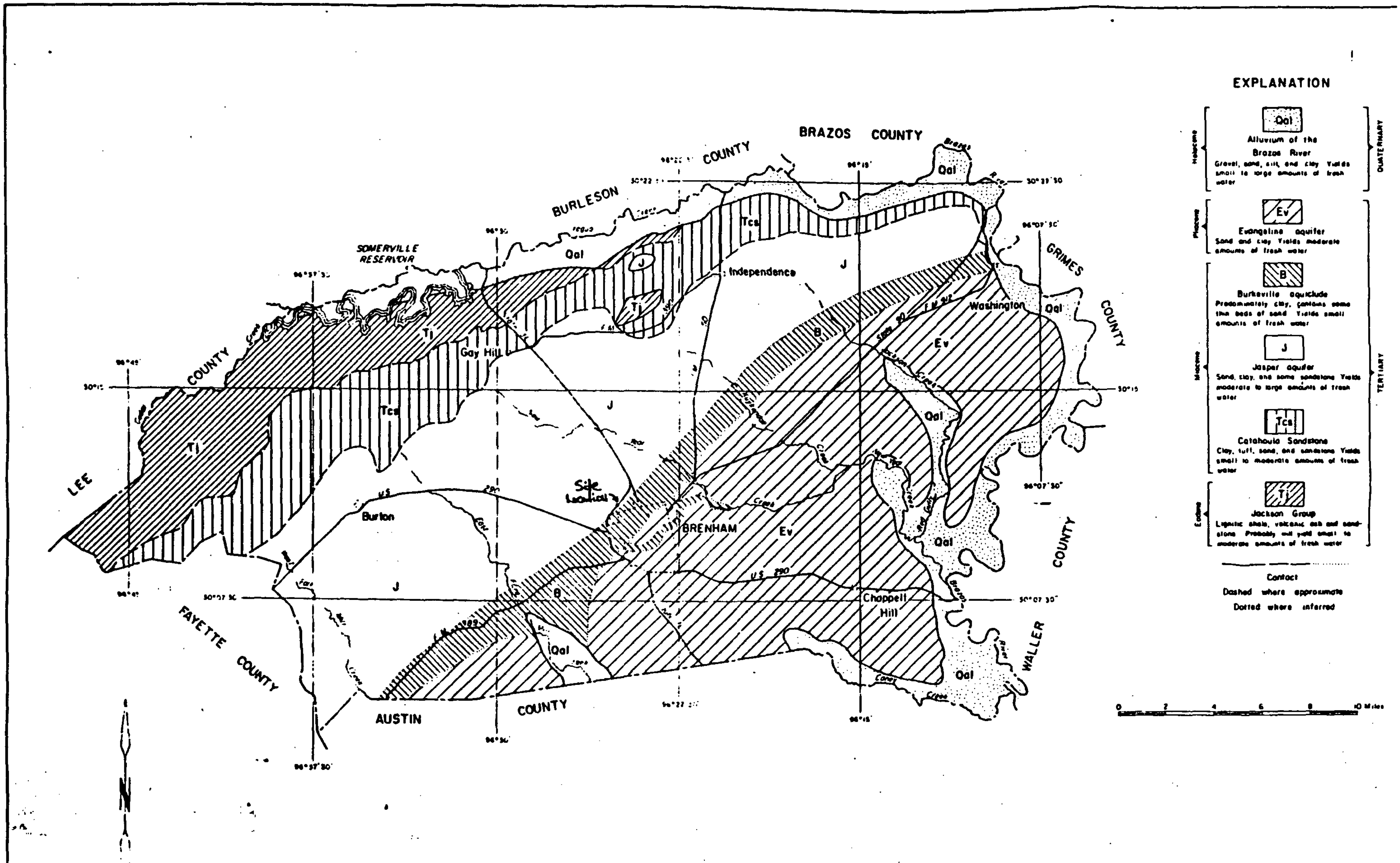


Figure 5
Outcrops of the Geologic and Hydrologic Units

Base from U.S. Geological Survey topographic quadrangles

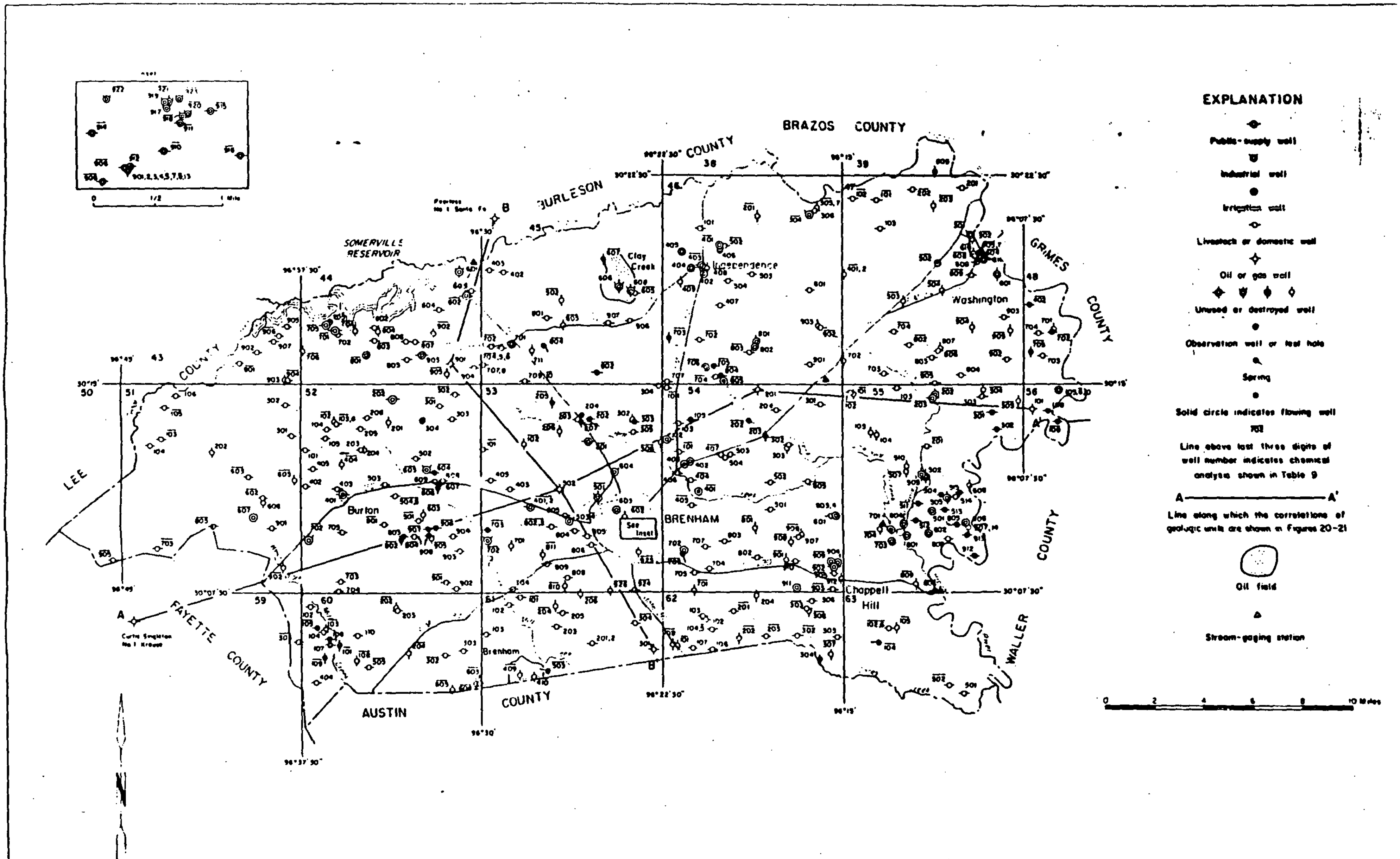


Figure 19
Locations of Wells, Spring and Test Holes

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* YY-59-52-906	Charles Hodde	Frank Bros.	1915	161	6	J	340	+	July 23, 1942	J,E,1/2 Flows	D	Measured flow 0.4 gpm, July 23, 1942.
* 907	Mrs. R. Wendler	--Bomill	1907	191	6	J	355	+	do.	E,<1 Flows	D	Flow small "trickle", July 23, 1942.
908	Harold Wendler	C. Erickson	1955	198	4	J	333	+	Jan. 3, 1969	J,E, Flows	D	Estimated flow 4 gpm, Jan. 3, 1969.
* 53-101	Vernon Runge	Beaumier Iron Works	1964	356	4	J	455	124.4	Dec. 12, 1968	S,E,1	D	Casing slotted from 301 to 352 ft.
* 102	A. D. Spinn	--	--	22	48	J	400	--	--	N	U	Dug well, rock curb. Old well.
* 201	Yegua Development Co.	Layne-Texas Co.	1964	1,070	8 5/8	J,Tcs	350	76.8	July 26, 1968	T,E,20	P	Casing slotted from 470 to 500, 505 to 625, 775 to 795, 805 to 825, 930 to 950, 960 to 970, 985 to 990, and 1,025 to 1,060 ft. 2/
* 202	C. Machemehl	Pomykal Drilling Co.	1965	320	2 1/2	J	255	+21.8	Nov. 19, 1968	N Flows	S	Open hole. Reported flow 10 gpm, Sept. 27, 1965. 2/
* 203	Richard Spinn	E. Gajeske	1940	175	4	J	270	--	--	J,E,1	D	Reported flowed until 1962.
204	do.	Seismic Crew	1953	104	4	J	265	15.0	Nov. 19, 1968	N	U	Seismic test hole. Reported flowed until 1962.
* 205	Leo Arndt	E. Gajeske	1924	69	7	J	330	+	July 31, 1942	Flows,N	U	Estimated flow 10 gpm, July 31, 1942.
* 206	H. Hodde	--	--	130	6	J	342	--	--	N	U	
* 207	J. F. Presley	Seismic Crew	1940	123	3	J	278	+	July 24, 1942	Flows	U	Measured flow 6 gpm, July 24, 1942. Reported no longer flows, Oct. 16, 1959.

See footnotes at end of table.

Within Three Mile Radius of the Site

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
YY-59-53-302	N. W. Freeman	--	--	80	6	J	261	5.0	Nov. 19, 1968	N	U	Reported well may be caved. Old well.
* 303	do.	Pomykal Drilling Co.	1955	261	4	J	261	+9.2	do.	J,E,1/2 Flows	D	Measured flow 17 gpm, Nov. 19, 1968. Reported has sulphur odor.
304	St. John's Church	do.	1965	312	4	J	371	108	Jan. 1965	S,E,<1	D	Casing slotted from 172 to 202 ft. 2/
* 305	N. W. Freeman	E. A. Holly Co.	1955	229	8	J	255	10.5	Feb. 11, 1969	S,E	D	Reported flowed when drilled, and for several years thereafter.
* 306	L. C. Jeske	Ed Hafer	1930	218	3	J	250	30	1930	J,E	U	Measured flow 1.7 gpm, July 2, 1942. Reported no longer flowed in 1968.
* 401	Robert Lange	Alfred Conklin	1953	434	4	J	422	--	--	J,E,3	P	
* 402	do.	Pomykal Drilling Co.	1961	436	4	J	422	123.9	Oct. 17, 1968	S,E,2	P	
403	Louis Look	E. Gajeske	1930	89	4	J	405	52.0	Dec. 12, 1968	S,E,1/3	D	
405	G. L. Morris	Pomykal Drilling Co.	1966	126	4	J	380	45	Sept. 1966	S,E,1/2	D	Casing slotted from 112 to 126 ft. 2/
* 501	The Old Brazos Forge	Beaumier Iron Works	1964	292	4	J	355	150	Nov. 1964	S,E,1	U	Casing slotted from 264 to 284 ft.
502	--Jackson well 1	Shell Oil Co.	1963	11,614	--	--	352	--	--	--	--	Oil test. 1/
503	Brenham Bowling Corp.	Pomykal Drilling Co.	1959	420	4	J	405	--	--	S,E	Ind	
* 504	do.	do.	1964	480	4	J	400	141	June 1964	S,E, 1 1/2	Ind	Casing slotted from 447 to 480 ft. 2/
505	Edwin Draehn	do.	1965	167	4	J	392	112	May 1965	S,E,<1	D	Casing slotted from 158 to 167 ft. 2/

See footnotes at end of table.

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* YY-59-53-602	Brenham Packing Co.	--	1942	48	5	B	289	32	May 1942	N	U	
603	Robert Gascamp	A. B. Conkling	1955	135	4	B	339	--	--	J,E,1	Irr	Casing slotted from 125 to 135 ft. 2/
604	F. C. Kugel	Beaumier Iron Works	1957	495	4	J	330	100	Feb. 1969	S,E, 1 1/2	Ind	Casing slotted from 475 to 495 ft.
701	Mt. Pilgrim Church	--	--	40	24	J	342	--	--	N	U	Dug well, concrete curb. Dry, Oct. 17, 1968.
* 702	W. Ludemann	--	1910	34	48	J	300	23.2 24.1	July 22, 1942 Oct. 17, 1968	J,E,3/4	Ind	Dug well, concrete curb. Pesticide and herbicide analyses taken Oct. 17, 1968; results negative.
* 703	Robert Lange	Pomykal Drilling Co.	1951	337	4	J	335	+	June 1951	J,E,1/2 Flows	D	Reported not flowing in 1968.
704	Travis Smith	J. W. Schwickert	1900	30	38	B	296	22.8	Dec. 27, 1968	J,E,1/2	D	Dug well, concrete curb.
* 802	V. Whitmarsh	J & S Drilling	1965	457	4	J	405	127.1	Oct. 17, 1968	S,E,1	D	
* 803	do.	A. B. Conklin	1950	127	4	J	406	--	--	P,E,1/2	D	
804	W. Engelage	Pomykal Drilling Co.	1967	168	4	B-J	380	105	Aug. 1967	S,E,1/2	D	Casing slotted from 149 to 168 ft. 2/
805	Leo Hinze	do.	1964	176	4	J	390	120	Apr. 1964	S,E,1/2	D	Casing slotted from 156 to 176 ft. 2/
806	Calvin Borman	do.	1967	63	4	B	398	48	Oct. 1967	S,E,1/2	D	Casing slotted from 50 to 63 ft. 2/
808	Wilfred Nordt	A. B. Conklin	1954	125	4	B	325	40	1965	J,E,1	S	Casing slotted from 115 to 125 ft.
809	J. A. Boeker	Preismeyer Bros.	1962	105	4	B	350	59.3	Dec. 19, 1968	J,E,1/2	D	
* 810	Fred Weiss	--	1890	41	24	B	311	31.7	July 15, 1942	N	U	Dug well, tile curb.
* 811	Charles Hodde	--	--	76	6	B	370	67	July 1942	N	U	Old well.

See footnotes at end of table.

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
YY-59-53-901	City of Brenham well 1	--	1913	320	8	J	310	58.7 57.2	June 23, 1942 Nov. 20, 1942	N	U	Abandoned in 1934; destroyed prior to 1959.
902	City of Brenham well 2	--	1913	185	12	J	320	59.5 56.6	June 23, 1942 Nov. 20, 1942	N	U	Destroyed prior to 1959.
903	City of Brenham well 3	G. C. Booth	1913	182	8	J	310	58.8	Nov. 20, 1942	N	U	
904	City of Brenham well 4	do.	1913	96	12	B	310	10.7	June 23, 1942	N	U	Destroyed prior to 1968.
* 905	City of Brenham well 5	Layne-Texas Co.	1933	1,515	8	Tcs	310	35.5	May 22, 1961	N	U	Screen from 1,210-1,240, 1,298-1,320, and 1,432-1,495 ft. 2/ 3/
* * 906	City of Brenham well 6	J. W. Jackson	1935	143	10	J;B?	310	41.0	Feb. 13, 1969	T,E,5	P	Water level measured while water was cascading through hole in casing at around 30 ft. 2/
* 907	City of Brenham well 7	do.	1934	198	10	J	310	67.2	May 22, 1961	N	U	3/
* 908	City of Brenham well 8	--	1944	200	6	J	310	--	--	N	U	
* * 909	City of Brenham well 9	Layne-Texas Co.	1948	511	5	J	310	82.3 68.1	July 24, 1968 Feb. 11, 1969	T,E,40	P	Screen from 98-121, 129-139, 169-190, 371-401, 424-434, and 479-512 ft.
* * 910	City of Brenham well 10	do.	1948	500	10	J	310	70	Jan. 1949	T,E,40	P	Screen from 84-120, 139-150, 188-211, 360-380, 438-449, and 468-490 ft. 2/
* 911	City of Brenham well 11	Texas Water Wells	1952	593	10	J	280	65	Aug. 1952	T,E,60	P	Screen from 73-88, 95-107, 122-142, 185-207, 298-308, 345-395, 465-505, 518-525 ft. 2/

See footnotes at end of table.

* No Longer Used For Public Water Supplies

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL BELOW LAND SURFACE DATUM (FT)	WATER LEVEL DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* YY-59-53-912	City of Brenham *	--	1884	Spring	--	B	305	+	Jan. 2, 1969	Flows	P	Spring, dug out and brick lined, used for "well reservoir". In use since about 1884, as auxiliary public supply source. Reported to flow continuously. Measured discharge 12 gpm, Jan. 2, 1969. Measured temp. 21°C.
913	City of Brenham well 9	Layne-Texas Co. and John Booth	1930	1,504	16	Tcs	310	--	--	N	U	Well never used. One of two wells numbered "9". Screen from 1,216-1,234, 1,257-1,303, 1,355-1,396, and 1,452-1,501 ft. Reported yield 406 gpm. 2/
* 914	Travis Voelkel *	Layne-Texas Co.	1907	785	12	J	336	--	--	T,E,10	P	
* 915	City of Brenham well 12	Texas Water Wells	1963	820	12	J	267	42	Dec. 1963	T,E,75	P	Casing: 12-in. to 415 ft; 10-in. from 415 to 820 ft. Screen from 75-86, 120-143, 350-414, 468-518, and 750-810 ft. 2/
* 916	City of Brenham well 13	do.	1968	1,000	12	J	315	200	Apr. 1958	T,E,100	P	Casing: 12-in. to 520 ft; 10-in. from 520-1,000 ft. Screen from 120 to 135, 395 to 470, 520 to 595, 835 to 885, and 970 to 990 ft.
917	Brenham Cotton Mills well 1	Beaumier Iron Works	1963	660	4	J	310	71	1963	S,E,5	Ind	Casing slotted from 464 to 542 ft.
* 918	Brenham Cotton Mills well 2	do.	--	598	4	J	310	96.6	July 30, 1968	S,E,5	Ind	Casing slotted from 349 to 577 ft.
919	Brenham Cotton Mills well 3	Pomykal Drilling Co.	1962	535	8	J	310	--	--	T,E,5	Ind	Screen from 494 to 535 ft. 2/

See footnotes at end of table.

* No Longer Used For Public Water Supplies

Table 6.--Records of Wells, Springs, and Test Holes--Continued

WELL	OWNER	DRILLER	DATE COMPLETED	DEPTH OF WELL (FT)	DIAMETER OF WELL (IN)	WATER-BEARING UNIT	ALTITUDE OF LAND SURFACE (FT)	WATER LEVEL: BELOW LAND SURFACE DATUM (FT)	WATER LEVEL: DATE OF MEASUREMENT	METHOD OF LIFT	USE OF WATER	REMARKS
* YY-59-53-920	Brenham Cotton Mills well 4	Beaumier Iron Works	1967	587	6	J	270	--	--	T,E,40	Ind	Screen from 294 to 416 ft. Reported pumping level 250 ft.
* 921	Brenham Cotton Mills	do.	1903	200	10 3/4	J	310	40 73.3	July 1941 July 30, 1968	N	U	
* 922	Brenham Bottling Co.	E. Gajeske	1955	168	4	J	335	40	1955	S,E, 1 1/2	Ind	Screen from 163 to 168 ft.
* 923	Blue Bell Creameries	do.	1923	180	6	J	315	79.0	Aug. 23, 1968	S,E,5	Ind	Screen from 160 to 180 ft. Used for cooling and washing.
* 924	M. C. Morris	A. B. Conklin	1960	212	4	Ev	372	132.9	Nov. 22, 1968	S,E,3/4	D	Screen from 198 to 212 ft.
* 925	Louise Stone	--Posey	1895	700	5	J	375	--	--	N	U	Drilled before 1906 by Heberstone. At 1,500 ft. water rose to within 40 ft. of the surface, but the well did not flow.
* 926	Albert Kramer	Walter Rinn	1930	102	3	Ev	370	--	--	N	U	
* 54-101	W. Schomburg	B & P Drilling Co.	1956	433	4	J	260	1.1	Sept. 16, 1968	S,E	D	Casing slotted from 412 to 433 ft.
102	City of Brenham Airport	Beaumier Iron Works	1967	210	6	J	240	.6	do.	S,E,3	P	Casing slotted from 168 to 210 ft. Test hole 343 ft.
103	B. R. Wellman	Pomykal Drilling Co.	1965	114	4	J	308	83	Apr. 1965	S,E,1/2	D	Casing slotted from 104 to 114 ft. Pump set at 105 ft. 2/
* 104	Mrs. P. Schulte	do.	1958	360	4	J	342	43.4	Aug. 16, 1968	S,E,3/4	D	
105	Henry Wellman	do.	1963	115	4	J	285	+	Jan. 29, 1963	Flows, N	D	Casing slotted from 103 to 115 ft. 2/
201	F. Fulberg	Mount Selman	1941	4,762	--	--	283	--	--	--	--	Oil test. 1/

See footnotes at end of table.

Ret. 4
Major 30897
3-10-82

RECEIVED
MAR 12 '82
ENFORCEMENT AND
FIELD OPERATIONS

TEXAS DEPARTMENT OF WATER RESOURCES
Industrial Solid Waste Disposal Compliance Monitoring Inspection

Inspection Cover Sheet (see reverse side for checklist use and general instructions)

Compliant ____ Texas Permit/Reg. No: 30897

Noncompliant xxx (explain by separate memo) EPA I.D. No. TXD048901235

Site Operator Information:

Name of Company Old Brazos Forge

Company's Address P. O. Box 140

Brenham, Texas 77833

Site Address Loop 36 N.W.

Brenham, Texas County Washington

Type of Industry manufactures steel wire shelves and display assemblies used in retail store displays.

Indicate below Classes of Waste managed (Hazardous-H, Class I nonhazardous-NH, Class II-II).

Generator H Transporter ____

Treatment H Storage H Disposal ____

Site Information (T.S.D. facilities only)

1. Are facilities located outside the 100 year flood plain area? Yes XX No ____

2. Describe land use within one mile Primarily industrial with limited residential

Inspection Information:

1. Inspectors Name & Title Robert J. Bressett, Field Representative Phone No. 713/479-5981

2. Inspection Date: February 10, 1982

3. Inspection Participants: Ed Green, Don Watley, Mickey Walker Phone No. 713/836-5626

Approved: Merton J Coloton Signed: Robert J Bressett
District Supervisor Inspector

RECEIVED
APR 19 1982

Date: MARCH 10, 1982

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

February 25, 1982

Mr. Mickey Walker
Old Brazos Forge
P. O. Box 140
Brenham, Texas 77833

Dear Mr. Walker:

Re: Old Brazos Forge, ISW Registration No. 30897

On February 10, 1982 Mr. Robert J. Bressett of this office conducted an industrial solid waste inspection. Deficiencies are noted as follows:

1. Notification of waste streams and waste management activities are not current as required by TDWR Rule 156.22.01.106(c).

2. The facility is not being maintained to prevent release of hazardous wastes to the environment as required by TDWR Rule 156.22.09.002. Also, under the Texas Water Code, Section 26.121, no person may discharge industrial waste into or adjacent to any water in the state except as authorize by a rule, permit, or order issued by this agency. A person who violates any provision of this chapter is subject to civil penalty and/or injunctive relief. Therefore, the existing discharge must be stopped immediately until proper treatment and a wastewater discharge permit from the agency is obtain

3. No contingency plan was noted as required by TDWR Rule 156.22.10.002 through .005.

4. No closure plan was noted as required by TDWR Rule 156.22.13.003.

5. No ground water monitoring system had been established as required by TDWR Rule 156.22.12.001.

6. All tanks observed do not have 2 feet of freeboard as required by TDWR Rule 156.22.16.002(c).

7. There was no record of tank inspections as required by TDWR Rule 156.22.16.0

ATTACHMENT

Mr. Ed Green, representing your facility in this matter, had advised this office that the following activities have been initiated:

a. Implementation of a waste analysis plan as required by TDWR Rule 156.22.08.004.

b. Adequate security measures as required by TDWR Rule 156.22.08.005(b).'

c. Signs have been posted with the legend, "Danger-Unauthorized Personnel Keep Out" as required by TDWR Rule 156.22.08.005(c).

d. Implementation of an inspection plan and schedule as required by TDWR Rule 156.22.08.006.

e. Attempts to familiarize local authorities with the characteristics of the facility as required by TDWR Rule 156.22.09.007(a) (1 and 4).

Please respond in writing within ten (10) days to our district office as to the corrections being made or to be made in order to comply with current state rules. A follow-up inspection will also be conducted by Mr. Bressett to verify the corrective measures taken to ensure compliance with the state Industrial Solid Waste Regulations.

If you have any questions, please contact Mr. Bressett at our district office.

Sincerely,

Merton J Coloton

Merton J. Coloton, P.E.
Supervisor, District 7

MJC/RJB/jea

cc: Mr. Ed Lamar Green
P. O. Box 3644
Beaumont, Texas 77704

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Generators Checklist

Section A - Manifest

1. Does generator dispose of (hazardous and/or non-hazardous) waste on-site only? Hazardous Yes___ No xx
   Non-Hazardous Yes___ No___

   a. If yes, do not fill out rest of Sections A and D.

   b. If no, identify primary off-site facility(s). Use comments sheet or add registration waste list properly annotated. see comments

2. Is the generator required to use a TDWR manifest shipping control ticket (Rule 156.22.01.110(a)? see comments Yes xx No___
   *335.10(a) &(b) & 335.64(a),(b), & (c)

   a. If yes, is manifest properly completed? Yes___ No___

   b. If no, explain in comments sheet.

   c. Does the generator receive return (white) copy of shipping control ticket? Yes___ No___

   *d. Is generator a small quantity generator? Yes___ No xx

NOTE: If 2d is yes, over 90-day storage without a permit is allowed.

Section B

1. Does the generator have any closed or abandoned facilities? Yes___ No xx
   see comments

   **a. If yes, explain in comments sheet.

Section C - Hazardous Waste Determination (Rule 156.22.01.106(e) & 156.22.06.002)
*335.6(e) &335.62

1. Does generator generate solid waste(s) listed in Part 261, Subpart D (List of Hazardous Waste)? Yes xx No___
   see attachment

2. Does generator generate solid waste(s) that exhibit hazardous characteristics? (corrosivity, ignitability, reactivity, EP toxicity) Yes___ No xxx

   a. Does generator determine characteristics by testing or by applying knowledge of processes? Applying knowledge of processes

      (1) If determined by testing, did generator use test methods in Part 261, Subpart C (or equivalent)? Yes___ No___

      (2) If equivalent test methods used, attach copy of equivalent methods used.

ATTACHMENT

* (Changed 2/5/82 Texas Administratibe Code Section reference added)
**(Indicates checklist questions which should be noted or completed at the time of an on-site inspection.)

3. Is notification of waste stream changes current? Yes___ NoXX
(Rule 156.22.01.106(c))
*335.6(b) & (c)
see comments

a. If no, explain in comments sheet.

4. Is any Class I non-hazardous Class II or PCB (storage) solid wastes generated? Yes___ No XX

a. Did the generator test all wastes to determine non-hazardous characteristics? Yes___ No XX

(1) If no, list wastes deemed non-hazardous or processes from which non-hazardous waste was produced. (Use xerox of registered material or add to comments sheet.) see comments

*335.65-.69
Section D - Pre-Transport Requirements (Rule 156.22.06.005-009)
(According to ______________________________)
Name, owner/operator/manager

1. Does owner/operator package waste for shipment? Yes___ No___ N/A

*a. If yes, complete this section, if no, go on to Section E (however see Notes, pp. 5).

2. Is generator familiar with 49CFR 173, 178 & 179 (DOT) requirements? Yes___ No___

**3. Does generator appear to have standard procedures for packaging labeling and marking of hazardous waste? Yes___ No___

**4. Does the generator mark each package in accordance with 49CFR 172? Yes___ No___

**5. Is each container of 110 gallons or less marked with the following label (49CFR 172-304)? Yes___ No___

Label saying: HAZARDOUS WASTE - Federal Law Prohibits Improper Disposal. If found, contact the nearest police or public safety authority or the U.S. Environmental Protection Agency.
Generator's Name and Address ______________________________
Manifest Document Number ______________________________

6. Accumulation Time - (May accumulate hazardous waste for up to 90 days without a permit provided; see Rule 156.22.06.009).
*335.69

a. Is the generator a permitted storage facility? Yes___ No___

b. Are containers used to temporarily store waste before transport? Yes___ No___

**(1) If yes, is each container clearly dated? Yes___ No___
Also, fill out rest of No. 6 (Accumulation Time)

ATTACHMENT
* (Changed 2/5/82 Texas Administrative Code Section references added)
**(See note, Page 3)

**(2) Are containers in good condition (check for leaks, corrosion, bulges, open, etc.)? Yes___ No___

(a) If no, explain in comments.

c. Does generator inspect containers for leakage or corrosion at least weekly? (Rule 156.22.15.005)? *335.245 Yes___ No___

(1) If leaking or bulging container is found, does operator transfer waste into a usable container (properly lined not to react with the waste)? Yes___ No___

(2) If no, explain in comments.

d. Does generator handle ignitable or reactive wastes? Yes___ No___

(1) If yes, go on to e.

**e. Does generator locate containers holding ignitable or reactive waste at least 15 meters (50 feet) from the facility's property line (40 CFR 265.176 - Special Requirements for Ignitable or Reactive Wastes and Rule 156.22.15.006)? *335.246 Yes___ No___

**f. Are containers holding incompatible wastes kept apart by physical barrier or sufficient distance? Yes___ No___

(1) If no, explain in comments.

NOTE: If tanks used, fill our checklist for tanks.

NOTE: If generator accumulates waste on-site for less than 90 days, (has no T.S.D. facilities) complete only Section D, F, and G of the Facilities Checklist. Small quantity generators are not subject to Rule 156.22.06.009 (a) (4) which is the basis for these requirements. *335.69(a)(4)

7. Describe drum or container storage area. Use photos and/or comments sheet.

**a. Does the storage area have containment protection provided (40 CFR 264.175--Use and Management of Containers, Containment)? NOTE: This will be a future permit requirement. Yes___ No___
*335.9 *335.70-.72

Section E - Record Keeping and Reports (Rule 156.22.01.109 and 156.22.06.010-.012)

1. Does generator keep the required records and reports for 3 years? Yes XX No___

a. If no, explain in comments sheet.

2. Where are records kept (at facility or elsewhere)? at facility

ATTACHMENT

*335.75

Section F - Special Conditions (Rule 156.22.06.015) N/A

1. Has generator received from or transported to a foreign source any hazardous waste? Yes___No___

   a. If yes, has he filed a notice with the Regional Administrator? (EPA requirement only) Yes___No___

   b. Is this waste manifested and signed by Foreign consignee? Yes___No___

   c. If generator transported waste out of the country, has he received confirmation of delivered shipment? Yes___No___

*335.6(b) & (c)

Section G - Waste Disposition Rule 156.22.01.106(b) and (c))

1. Do the disposal methods described in the registration agree with actual situations? Yes___No XX

   a. If no, explain in comments sheet or add copy of annotated registration waste list. see comments

**2. Is there any evidence of spills or unauthorized discharges? Yes XX No___

   a. If yes, explain in comments sheet. see comments

*(Changed 2/5/82, Texas Administrative Code Section references added)

ATTACHMENT

NOTICE OF REGISTRATION

Industrial Solid Wa te Generation/Disposal

This is not a permit and d s not constitute authorization of any disposal facilities listed below. Requirements for solid waste management are provided by TWQB Order 75-1125-1.

REGISTRATION NUMBER 30897 (supersedes Registration Number - N/A)

This number is to provide access to stored information pertaining to your operation. Please refer to this number in any correspondence or reports.

Company Name: Old Brazos Forge

Mailing Address: P. O. Box 140, Brenham, Texas 77833

Site Location: Loop 36 N.W., Brenham, Texas

Person in Charge: W. H. Vesper   Phone: 713/836-5626

TWQB District: 3   No. of Employees: <100

I. WASTES GENERATED

WASTES GENERATED	CLASS	CODE	DISPOSITION
L 1. Rinse waters from metal plating	I	100610	On-site (Lagoon/ Pond)

II. SHIPPING/REPORTING Under Chapter 4, TWQB Order 75-1125-1, issuance of shipping-control tickets and monthly reporting are required for off-site disposal of the Class I wastes listed in Part I. The first Shipment Summary Report should be submitted for the month of no later than . Forms and instructions are enclosed for the following wastes now being shipped:

Not Applicable

ATTACHMENT

NOTICE OF REGISTRATI... (continued)
Registration Number 30897
Company Name Old Brazos Forge
Page 2

III. ON-SITE DISPOSAL FACILITIES

1. Lagoon/Pond for disposal of waste no. 1.

These disposal facilities are constructed on property owned and controlled by Old Brazos Forge, Brenham, Washington County, Texas in the watershed of Segment 1202 of the Brazos River Basin.

IV. RECORDS

A. For purposes of filing annual disposal reports pursuant to Section 4.03 B. of TWQB Order 75-1125-1, records should be maintained for disposal of the following waste(s) listed in Part I:

1. 100610 Rinse water

B. Proof of recordation in the county deed records as required by Section 1.05, TWQB Order 75-1125-1, should be submitted to the Texas Water Quality Board no later than June 30, 1976 for the following disposal facilities as listed in Part III:

1. Lagoon/Pond

GEM/scg

DATE February 18, 1977

ATTACHMENT

ATTACHMENT

Table III-1 Generated Hazardous Wastes and Management Activities

Verbal Description of Waste	TDWR Sequence Number	TDWR Waste Code Number	EPA Hazard Code	EPA Hazardous Waste No.	Waste Management Activities (Check applicable items) Off-Site Disposal	On-Site Storage[1]	On-Site Processing[2]	On-Site Disposal	Annual Quantity Generated (lbs)	SIC Code and Process
Rinse waters from metal plating.	1	100610	R,T	F006	X	X	X	X	Unknown*	SIC Unknown
Same as above	NA		R,T	F007	X	X	X	X	*	SIC Unknown
Same as above	NA		R,T	F009	X	X	X	X	*	SIC Unknown
Same as above	NA		T	F014	X	X	X	X	*	SIC Unknown

*NOTE: The above waste is present as solids in water and the quantity will vary, depending upon the concentration of the solid material. All waste is treated by chemical precipitation, with the precipitated solids to be stored and disposed at a Class I disposal facility. Expected total quantity of water to be generated each year shall be 21,684,000 lbs, of which only a small percentage will be considered to be hazardous waste.

[1] "Storage" means the interim containment or control of waste after generation and prior to ultimate disposal.

[2] "Processing" means the extraction of materials, transfer, volume reduction, conversion to energy, or other separation and preparation of solid waste for reuse or disposal, including the treatment or neutralization of hazardous waste so as to render such waste nonhazardous, safer for transport, amenable for recovery, amenable for storage, or reduced volume. The "transfer" of solid waste for reuse or disposal as used above, does not include the actions of a carrier in conveying or transporting solid waste by truck, ship, pipeline, or other means.

Checklist Generators
(attach. to correct checkli:

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: A-manifest Paragraph: 1.b.

At time of inspection subject facility was discharging without a permit into a minor creek of the Brazos River Basin.

SECTION: A-manifest Paragraph: 2

No shipments of waste had been made.

SECTION: B Paragraph: 1

No closed or abandoned facilities to date, but anticipate closure of 3 lagoons in very near future.

ATTACHMENT

Checklist Generators
(attach. to correct checklis

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: C Hazard Waste Determin. Paragraph: 3.a.

Notice of Registration needs to include plant refuse. Also, the facility was advised to update waste stream changes relevant to the pretreatment system that will be going on-line in March.

SECTION: C Paragraph: 4.a.1.

No other wastes generated, except plant refuse.

SECTION: G Waste Disposition Paragraph: 1.a.

Disposal methods are being updated to reflect the actual disposition.

ATTACHMENT

Checklist Generators
(attach. to correct checkl

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: G-Waste Disposition Paragraph: 2.a.

Rinse solution from floor drains was being discharged out across the watershed and into a creek. Also a discharge was noted going from a precipitation pond to the creek. Both discharges probably will exhibit listed characteristics per Part 261 Subpart D.

SECTION: Paragraph:

SECTION: Paragraph:

ACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Facilities Checklist - Rule 156.22.01.102 and 156.22.08.001-008
*335.2 *335.111-.118

Section A - General Facility Standards

1. Has proof of deed recordation of on-site disposal facilities been provided to the agency? (Rule 156.22.01.105, for hazardous waste see Rule 156.22.13.010) Note: Not required for Waste Disposal Well. *335.5, 335.220 — Yes___ No XX
   a. If no, explain in comments sheet. see comments

**2. Has any evidence of spills or unauthorized discharge(s) been observed/reported (Rule 156.22.01.104)? *335.4 — Yes XX No___
   a. If yes, explain in comments sheet. see comments

3. NOTE: A sketch of facilities, general site orientation showing landfills, surface impoundments, injection wells, drainage routes, water bodies/cources and other pertinent features (Separate sketch or diagrams of landfill(s) etc.) should be attached to this and other facility checklist(s). see attachment

   NOTE: For all non-hazardous and non-commercial facilities do not complete the remainder of this Facilities Checklist. Proceed to specific type facility checklists and complete one checklist for each disposal facility or multi-comments on a single checklist.

4. Has facility received hazardous waste from a foreign source (Rule 156.22.08.003)? *335.113 — Yes___ No___ N/A
   a. If yes, has he filed a notice at least 4 weeks in advance to receipt with the Executive Director and the Reg. Admin.? — Yes___ No___
      (1) If no, explain in comments sheet.

Section B - Waste Analysis - Rule 156.22.08.004
*335.114

1. Does facility have a waste analysis plan? — Yes XX No___
   a. If yes, is it maintained at the facility? — Yes XX No___
   b. Does the waste plan include the following?
      (1) Parameters for which each waste will be analyzed? — Yes XX No___
      (2) Test methods used to test for these parameters? — Yes XX No___
      (3) Sampling method used to obtain sample? — Yes XX No___

ATTACHMENT

*(Changed 2/5/82 Texas Administrative Code Section references added)
**(Note; Indicates checklist questions which should be noted or completed at the time of an on-site inspection.

(4) Frequency with which the initial analysis will be reviewed or repeated? Yes XX No___

(a) If yes, does it include requirement to repeat whenever wastestream or process(s) is changed? Yes XX No___

(5) (For off-site facilities) Waste analyses that generators have agreed to supply? Yes___ No___

(6) (For off-site facilities) Procedures which are used to inspect and analyze each movement of hazardous waste including:

(a) Procedures to be used to determine the identity of each movement of waste? Yes___ No___

(b) Sampling method to be used to obtain representative sample of the waste to be identified? Yes___ No___

(c) If the answers to 1, 1a or 1b(1)-(6) is no, explain in comments sheet or attach corrective action letter to facility.

**2. Does the facility provide adequate security through (Rule 156.22.08.005):
*335.115

(a) 24-hour surveillance system? (e.g. television monitoring or guards) Yes___ No___

OR

(b) (1) Artificial or natural barrier around facility (e.g. fence or fence and cliff)? Yes XX No___

Describe Chain link fence with locked gate surrounding facility

(2) Means to control entry through entrances (e.g. attendant, television monitors, locked entrance, controlled roadway access)? Yes XX No___

Describe entrance to facility is thru plant entrance only, with attendant

**3. Does the facility have a sign with the legend "Danger - Unauthorized Personnel Keep Out" (Rule 156.22.08.005(c) unless exempt under Subsections (a)(1) and (a)(2))? *335.115 Yes XXX No___

a. Unless exempt, if no, explain in comments sheet.

**(See note, Page 7)
* (Changed 2/5/82 Texas Administrative Code Section references added)

ATTACHMENT

*335.116

Section C - General Inspection Requirements - Rule 156.22.08.006

1. Does facility have a written inspection schedule (and plan)? Yes xx No___

   (a) If yes, is the schedule maintained at the facility? Yes xx No___

   (b) Does the inspection schedule (plan) provide for inspecting the following:

      (1) Monitoring equipment? Yes xx No___

      (2) Safety and emergency equipment? Yes xx No___

      (3) Security devices? Yes xx No___

      (4) Operating and structural equipment? Yes xx No___

      (5) Does the schedule or plan identify the types of problems to be looked for during inspection:

         (a) Malfunctions and deterioration? Yes xx No___

         (b) Operator error? Yes xx No___

         (c) Discharges or threat of discharges? Yes xx No___

2. Does the owner/operator maintain an inspection log? Yes xx No___

   a. If yes, does it include:

      (1) Date and time of inspection? Yes XX No___

      (2) Name of inspector? Yes XX No___

      (3) Notation of observations? Yes XX No___

      (4) Date and nature of repairs or remedial action? Yes XX No___

   **b. Are there any malfunctions or other deficiencies noted in the inspection log that remain uncorrected? Yes___ No XX

   c. Are the inspection log records maintained for 3 years? Yes XX No___

3. If the answers to 1, 1a, 1b(1)-(5), 2, 2a(1)-(4), or 2c, is no, explain in the comments sheet or attach a copy of the corrective action letter sent to the facility. If for 2b the answer is yes, explain in comments sheet.

* Changed 2/5/82 Texas Administrative Code Section references added)
** (See note, Page 7)

ATTACHMENT

*335.117

Section D - Personnel Training - Rule 156.22.08.007

1. Does the owner/operator maintain Personnel Training Records at the facility? Yes XX No___
   How long are they kept? ____________________
   (Current personnel - for the life of site; former employees - for 3 years)

   a. If yes, do they include:

      (1) Job Title and written job description of each position? Yes XX No___

      (2) Description of type and amount of training? Yes XX No___

      (3) Records of training given to facility personnel? Yes XX No___

   b. If the answers to 1, 1a(1)-(3) is no, explain in the comments sheet or attach a copy of the corrective action letter sent to the facility.

Section E - Requirements for Ignitable, Reactive or Incompatible Waste - Rule 156.22.08.008

*335.118

1. Does facility store or dispose of ignitable and/or reactive wastes (if no, go on to Section F)? Yes XX No___

   a. Is the owner/operator familiar with proper separation and safeguards needed to prevent ignition or reaction of ignitable or reactive waste? (Reference - see also Appendix IV of Rule 156.22. 05)

      *335.48

      (1) Use comments sheet to describe separation and confinement procedures.

      (2) Use comments sheet to describe any potential sources of ignition or reaction. N/A

   b. Are smoking and open flame confined to specifically designated locations? Yes XX No___

   **c. Are "No Smoking" signs posted in hazardous areas? Yes XX No___

   d. If answer(s) to 1b or 1c are no, explain in comments sheet.

2. Inspect containers:

   **a. Are containers leaking, bulging, or corroding? Yes___ No___ N/A

   b. If yes, explain in comments sheet.

*(Changed 2/5/82 Texas Administrative Code Section references added)

**(See note, Page 7)

ATTACHMENT

Section F - Preparedness and Prevention - Rule 156.22.09.001-.007

**1. Is there evidence of fire, explosion, or contamination of the environment? Yes xx No___

a. If yes, use comments sheet to explain. see comments

2. Is the facility equipped with:

a. Internal communication or alarm system? Yes XX No___

**(1) Is it easily accessible in case of emergency? Yes XX No___

b. Telephone or two-way radio to call emergency response personnel? Yes XX No___

**c. Portable fire extinguishers, fire control equipment spill control equipment and decontamination equipment? Yes XX No___

(1) Is this equipment tested to assure its proper operation? Yes XX No___

d. Water of adequate volume for hoses, sprinklers or water spray system? Yes___ No___ N/A

(1) Source of Water: ______________________

(2) Pumping or delivery rate: ______________________

**3. Is there sufficient aisle space to allow unobstructed movement of personnel and equipment? Yes xx No___

4. Has the owner/operator made arrangements with the local authorities to familiarize them with characteristics of the facility? (Layout of facility, properties of hazardous waste handled and associated hazards, places where facility personnel would normally be working, entrances to roads inside facility, possible evacuation routes.) Yes xx No___

5. In the case that more than one police and fire department might respond, is there a designated primary authority? Yes___ No___ N/A

a. If yes, list primary authority ______________________

6. Does the owner/operator have phone numbers of and agreements with State emergency response teams, emergency response contractors and equipment suppliers? Yes___ No XX

a. Are they readily available to the emergency coordinator? Yes___ No___ N/A

7. Has the owner/operator arranged to familiarize local hospitals with the properties of hazardous waste handled and types of injuries that could result from fires, explosions, or releases at the facility? Yes XX No___

ATTACHMENT

8. Have State or local authorities declined to enter into arrangements 4-7 above? Yes___ No XX

   a. If yes, does the operating record indicate this? Yes___ No N/A

*335.151-.157

Section G - Contingency Plan & Emergency Procedures - Rule 156.22.10.001-.007

1. Is there a contingency plan? Yes___ No XX

   a. If yes, is it maintained at the facility? Yes - No___
   b. If yes, is it a revised SPCC Plan? Yes___ No___

2. Is there an emergency coordinator on-site or on call at all times? Yes___ No XX

3. If answer is no to any or all of Section F 2-7 and G, explain in comments sheet. see comments

*335.171-.177

Section H - Manifest System, Recordkeeping & Reporting - Rule 156.22.11.001-.007

1. Does facility receive waste from off-site? Yes___ No XX

   a. If yes, does the owner/operator comply with manifest requirements? Yes___ No___
   b. If 1 is no, go on to question 4 below.

2. Does the facility receive any waste from a rail or water (bulk shipment) transport? Yes___ No XX

   a. If yes, is it accompanied by a properly executed shipping paper? Yes___ No___

3. Has the owner/operator received any shipments of waste which were inconsistent with the manifest? Yes___ No XX

   a. If yes, has he attempted to reconcile the discrepancy with the generator and transporter? Yes___ No___

*4. Does the owner/operator keep a written operating record at the facility (Rule 156.22.11.003)? Yes XX No___

*335.173

   a. Does the operating record reflect the following:

      (1) Description, quantity of each hazardous waste received and method(s) and date of T.S.D. at the facility? Yes XX No___
      (2) Location and quantity of each hazardous waste within the facility (for disposal facilities quantity on a mpa or diagram of each cell or disposal area, for all facilities cross-reference to shipping ticket Nos.)? Yes XX No___

*NOTE: This question applies to all Hazardous Waste Generators, including on-site facilities.

*(Changed Texas Administrative Code Section references added)
** (See note, Page 7)

ATTACHMENT

(3) Records and results of waste analyses and trial tests? Yes XX No___

(4) Summary Reports of all incidents that require implementing the contingency plan? Yes___ No___ N/A

(5) Closure cost estimates for all facilities. (Rule 156.22.14.002) Yes___ No XX
*335.232

(6) Post closure cost estimates for disposal facilities. (Rule 156.22.14.003) Yes___ No XX
*335.233

b. If no for Section H, 1-3a, & 4 all, explain in comments sheet. see comments

5. Does the owner/operator maintain a closure plan for all facilities (Rule 156.22.13.001-006)? Yes___ No XX
*335.211-.216

a. If no, explain in comments sheet.

6. Does the owner/operator maintain a post closure plan for disposal facilities (Rule 156.22.13.007-010)? Yes___ No XX
*335.217-.220

a. If no, explain in comments sheet.

7. Do records indicate that the facility received any waste not accompanied by a manifest (Rule 156.22.01.115(a) and (b) (for facilities receiving from off-site only)? *335.15 Yes___ No XX

a. If yes, has he submitted an unmanifested waste report to the Executive Director (Rule 156.22.01.115(c) and 156.22.11.006)? *335.15(c) Yes___ No___
*335.176

(1) If no, explain in comments sheet.

*(Changed 2/5/82, Texas Administrative Code Section references added)

ATTACHMENT

(3) Records and results of waste analyses and trial tests? Yes XX No___

(4) Summary Reports of all incidents that require implementing the contingency plan? Yes___ No___ N/A

(5) Closure cost estimates for all facilities. (Rule 156.22.14.002) Yes___ No XX
*335.232

(6) Post closure cost estimates for disposal facilities. (Rule 156.22.14.003) Yes___ No XX
*335.233

b. If no for Section H, 1-3a, & 4 all, explain in comments sheet. see comments

5. Does the owner/operator maintain a closure plan for all facilities (Rule 156.22.13.001-006)? Yes___ No XX
*335.211-.216

a. If no, explain in comments sheet.

6. Does the owner/operator maintain a post closure plan for disposal facilities (Rule 156.22.13.007-010)? Yes___ No XX
*335.217-.220

a. If no, explain in comments sheet.

7. Do records indicate that the facility received any waste not accompanied by a manifest (Rule 156.22.01.115(a) and (b) (for facilities receiving from off-site only)? *335.15 Yes___ No XX

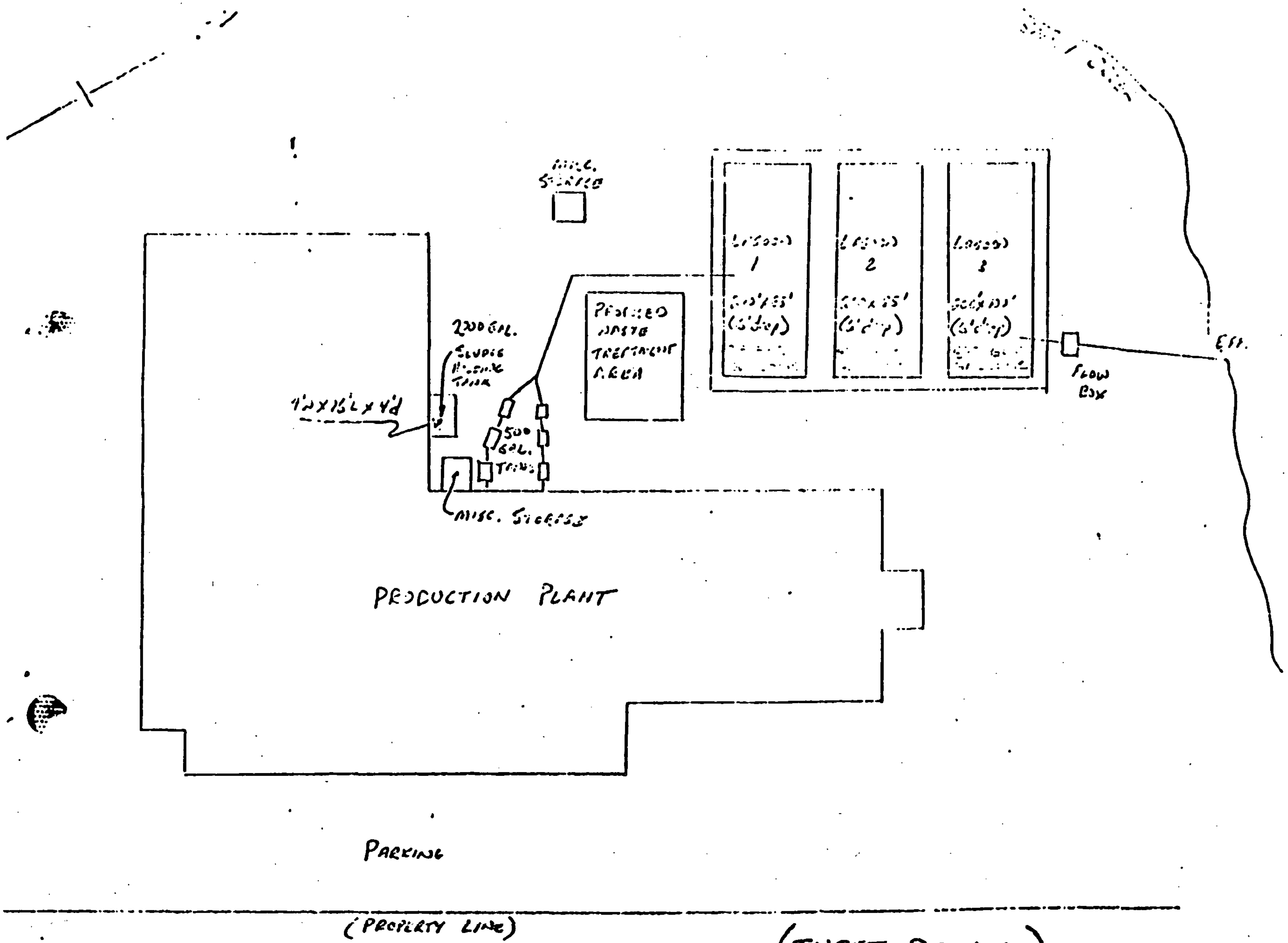
a. If yes, has he submitted an ~~unmanifested waste~~ report to the Executive Director (Rule 156.22.01.115(c) and 156.22.11.006)? *335.15(c) Yes___ No___
*335.176

(1) If no, explain in comments sheet.

*(Changed 2/5/82, Texas Administrative Code Section references added)

ATTACHMENT

ATTACHMENT



(INSET DRAWING)

OLD BRAZOS FORGE PLANT LAYOUT
(NOT TO SCALE)

Checklist Facilities
(attach. to correct checklis

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: A-General Facility Paragraph: 1.a.

Facility was advised to deed record the lagoons

SECTION: A-General Facility Paragraph: 2.a.

Facility was discharging without required permit.

SECTION: E-Requirements .... Paragraph: 1.a.(1)

Waste streams are separated by process and stabilized prior to commingling, i.e. the solids are precipitated out.

See attachment

...MENT

Checklist Facilities
(attach. to correct checkl

Date February 10, 1982

Reg./Permit No. 30897

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: F-Preparedness--- Paragraph: 1.a.

Watershed surface and creek water contaminated from effluent discharge.

SECTION: G-Contingency Plan Paragraph: 1. and 2.

Facility plant manager stated that he wasn't aware that a contingency plan was required. No one was designated as an emergency coordiantor.

SECTION: H-Manifest System Paragraph: 4 a (5) and (6)

No closure plan or post-closure plan in existence. Comment also applicable for H. 5.a. and 6.a.

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Surface Impoundments Checklist (Rule 156.22.17.001-008) Class of Waste (

1. Are surface impoundments presently used to treat or store waste? Yes XX No___

   a. If yes, inspect the impoundments.

**2. Does the impoundment appear to maintain at least 2 feet (60 cm) of freeboard? Yes XX No___

**3. Is there evidence of overtopping of the dike? Yes___ No XX

   a. If yes or if less than 2 feet, explain in comments sheet.

4. Containment system for dyked or dammed impoundments (Rule 156.22.17.003).

   **a. Does the earthen dike have a protective cover (e.g. grass, shale, rock) to minimize wind and water erosion? Yes XX No___

   b. If no, explain in comments sheet.

5. What wastes are treated or stored in the impoundment?___

   See attachment

6. Are waste analyses and trial tests conducted on these wastes (chemical processing of a different hazardous waste or method only)? Yes XX No___

   a. If not, does the owner/operator have written documented information on similar treatment of similar wastes? Yes XX No___

7. Is this information retained in the operating record? Yes XX No___

8. Is the impoundment inspected daily to check freeboard level? Yes XX No___

9. Is the impoundment, dikes and vegetation surrounding the dike inspected weekly to detect leaks, deterioration or failures? Yes XX No___

**See Note on Page 1

ATTACHMENT

**a. Is there any evidence of seepage? Yes___ No xx

(1) If Yes, explain in comments sheet.

10. Does the impoundment have a liner? Yes xx No___

a. If Yes, what type? Bentonite

b. If Yes, does it have a leachate collection and removal system? Yes___ No xx

**11. Is there evidence of ignitable or reactive wastes placed in the impoundment? Yes XX No___

a. If Yes, explain in comments sheet. See comments

or

b. Is the impoundment used solely for emergencies? Yes___ No XX

**12. Is there evidence of incompatible wastes placed in the impoundment? Yes___ No XX

13. Are monitor wells required for this site? (Refer to Rule 156.22.12.001-.005 - Ground Water Monitoring) Yes XX No ___

a. Has owner/operator installed, operated and maintained a ground water monitoring system (unless waived) prior to 11/19/81? Yes___ No XX

NOTE 1: Attach Ground Water Monitoring Report if answer to question 13 is yes.
NOTE 2: If the answer is No for Nos. 6a, 7, 9, 9 and No. 13 after 11/19/81, explain in comments sheet. If the answer to No. 12 is yes, explain in comments sheet.

14. Describe impoundment(s) site and indicate plat map, location(s) and designation(s). Also describe each impoundment's dimensions and capacity (acre-feet): See attachment.

ATTACHMENT

Checklist Surface Impoundmen
(attach. to correct checkli

Date February 10, 1982

INDUSTRIAL SOLID WASTE

Reg./Permit No. 30897

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: N/A Paragraph: 11.a

Reactive wastes are placed in the impoundments (3). i.e. Rinse water from metal plating. EPA hazardous waste numbers F006, F007, and F009.

SECTION: N/A Paragraph: 13.a.

Facility was not aware of the requirement.

SECTION: Paragraph:

ATTACHMENT

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report
Tanks Checklist (Rule 156.22.16.001-007) Class of Waste (

Section A - General

1. Are tanks presently used to treat or store waste? Yes xx No___
   a. If no, do not complete rest of form. — see comments
   **b. If yes, check tanks. (Describe type of tank and indicate underground, above ground, or on-ground in comments sheet). Yes___ No___
   **c. Is there evidence that incompatible wastes have been placed in the tank? Yes___ No XXX
      (1) If yes, explain in comments sheet.
   **d. Is there evidence of any ruptures, leaks or corrosion of the tank(s)? Yes___ No XXX
      (1) If yes, explain in comments sheet.

2. Are there any uncovered tanks? Yes xx No___
   a. If no, do not complete - e.
   **b. If yes, do they have 2 feet (60 cm) freeboard? Yes___ No xx

   or

   **c. A containment structure? (e.g. dike or trench) Yes xx No___

   or

   **d. A drainage control system? Yes___ No___
   **e. A diversion structure? (e.g. standby tank) (NOTE: The structure in c, d or e must have a capacity that equals or exceeds the volume of the top 2 feet (60 cm) of the tank.) Yes XX No___

3. Are any of the tanks continuous feed? Yes XX No___
   **a. If yes, is it equipped with a means to stop inflow (e.g. waste feed cutoff or bypass to a stand-by tank)? Yes XX No___

Section B - Waste Analysis

1. Is the tank used to store one waste exclusively? Yes___ No XX
   a. If no, what are the different wastes stored in the tank?
   Precipitates of individual stabilization and process streams for removal of copp chromium, cyanide complexes, nickel, and zinc.

** Note checklist questions to be noted or completed during on-site inspection

...HMENT

b. Are waste analyses and trial treatment or storage tests done on these different wastes? Yes___ No XX

(1) If no, does he have written, documented information on similar storage or treatment of similar wastes? Yes XX No___

c. Are there records available of these waste analyses in the operating record? Yes___ No XX

Section C - Inspections

1. Do the records indicate the owner/operator inspects, where present, the following at least daily:

a. Discharge control equipment (e.g. waste feed cut-off, by pass and/or drainage system)? Yes xx No___

b. Monitoring equipment (e.g. pressure and temperature gages)? Yes xx No___

c. Level of waste in each uncovered tank? Yes xx No___

2. Do the records indicate the owner/operator inspects the following at least weekly:

a. Construction materials of tanks for corrosion or leaks? Yes XX No___

b. Construction materials of and area surrounding discharge confinement structures for erosion or signs of leakage? Yes XX No___

3. Is there a written inspection schedule (Rule 156.22.08/006)? Yes XX No___

a. If yes, is the schedule kept at the site? Yes XX No___

b. If no for 3 or 3a, explain in the comments sheet.

4. Is there evidence of ignitable wastes placed in tanks? Yes___ No XX

a. If yes, do records indicate that they are treated, rendered, or mixed before or immediately after placement in the tank so it no longer meets the definition of ignitable? or Yes___ No___

**b. Is the waste protected from sources of ignition? Yes___ No___

(1) If yes, use comments sheet to describe separation and confinement procedures.

(2) If no, use comments sheet to describe sources of ignition. or

c. Is the tank used solely for emergencies? Yes___ No___

ATTACHMENT

5. Is there evidence of reactive wastes placed in tanks? Yes xx No___

a. If yes, do records indicate that they are treated rendered, or mixed before or immediately after placement in the tank so it no longer meets the definition of reactive? or Yes___ No xx

**b. Is the waste protected from sources of reaction? Yes xx No___

(1) If yes, use comments sheet to describe separation and confinement procedures. See comments

(2) If no, use comments sheet to describe sources of reaction. or

c. Is the tank used solely for emergencies? Yes___ No xx

6. Do the records indicate that incompatible wastes are placed in the same tank? Yes___ No xx

a. If yes, explain in the comments sheet.

7. If a waste is to be placed in a tank that previously held an incompatible waste do operating records indicate that the tank was washed? Yes___ No___ N/A

a. If yes, describe washing procedures. ______________________

____

b. Describe how it is possible for incompatible waste to be placed in the same tank. ______________________

____

____

NOTE: If the answer to Section A 2b-e and 3a, Section B 1b(1) and 1c, and Section C 1a-c, 2a, and 2b was no, explain in comments sheet.

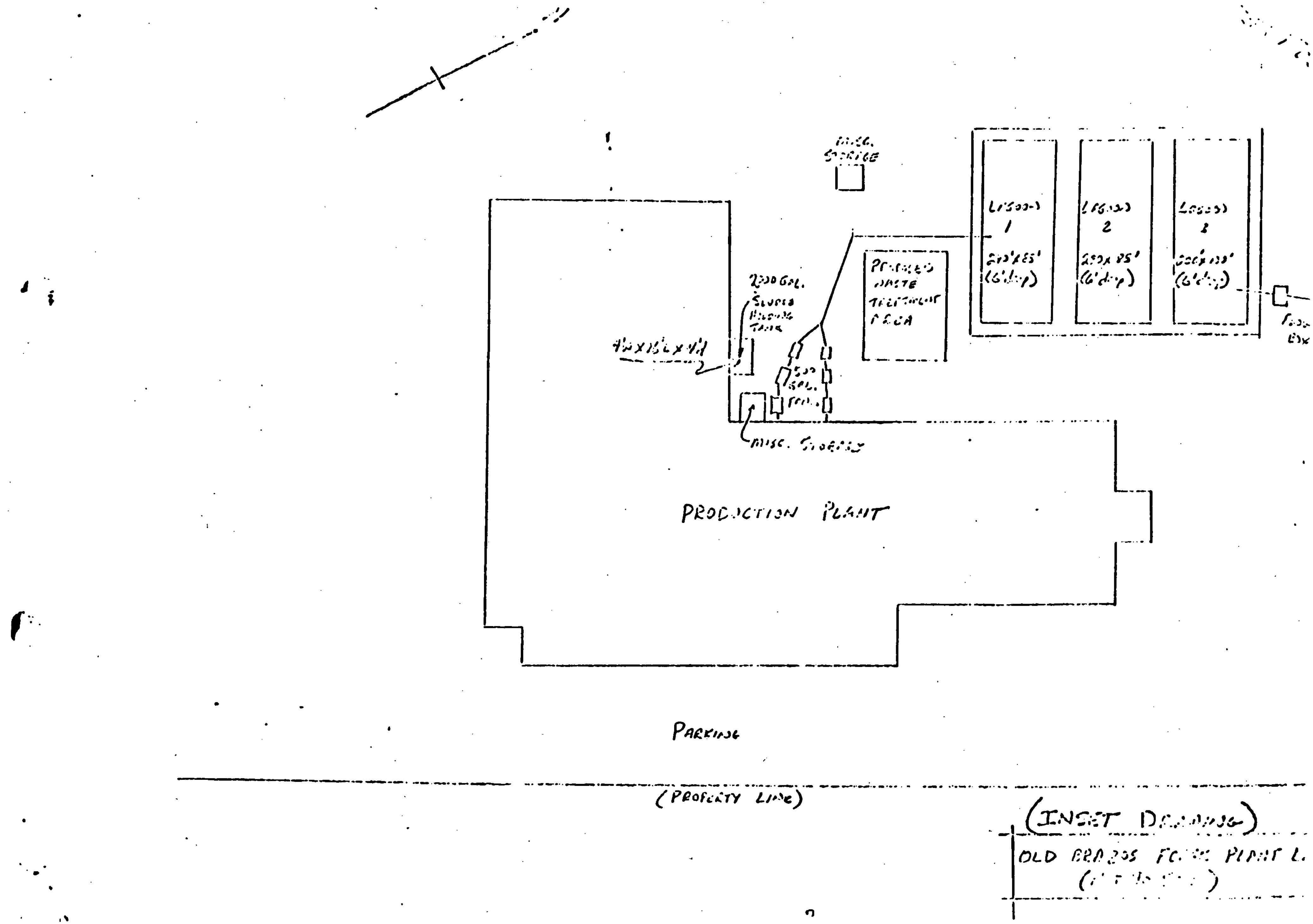
8. Describe tank(s) site and indicate plat map location(s) and designation(s). Also describe size and capacity of each tank: ______________________

See attachment

____

** See note on page 9.

ATTACHMENT


MISC. STORAGE
PRODUCTION PLANT
PARKING
(PROPERTY LINE)
(INSET DRAWING)

Checklist_
(attach.

Date Fe

Reg./Perm

INDUSTRIAL SOLID WASTE

Compliance Monitoring Inspection Report

COMMENTS SHEET

SECTION: A-General Paragraph: 1.b.

All tanks are on-ground, P.V.C. liner steel. They are used for pH

wastewaters to allow precipitation of solids.

SECTION: C-Inspections Paragraph: 5.b.(1)

Waste streams are separated at origin.

SECTION: Paragraph:

Ref. 5

LAMAR GREEN COMPANY
Post Office Box 3044
Beaumont, Texas 77704
713 [illegible]32 4194

Received 5-4-82

April 26, 1982

Mr. Harvey Davis
Executive Director
TEXAS DEPARTMENT OF WATER RESOURCES
P.O. Box 13087
Capitol Station
Austin, TX 78711

Re: Old Brazos Forge, Brenham, TX

Dear Mr. Davis:

Transmitted herewith you will find Closure Plan pursuant to the provisions of the Texas Industrial Solid Waste Act for your approval. Please note that there is an imminent need for prompt consideration of the Plan as contractual obligations exist relative to the property being used as a construction site.

Respectfully yours,

Lamar G.

Lamar Green

LG:mdh
Enclosures
cc: Mr. Mickey Walker
General Manager
Old Brazos Forge, Inc.

Mr. Robert J. Bressett
Field Representative
Texas Department of Water Resources
District 7

LAMAR GREEN COMPANY

Post Office Box 3644
Beaumont, Texas 77704
713-832-4194

PLAN FOR PARTIAL CLOSURE

PRIOR TO DEVELOPMENT OF FULL CLOSURE PLAN

FOR EARTHEN LAGOONS

OLD BRAZOS FORGE

BRENHAM, WASHINGTON COUNTY, TEXAS

APPLICABILITY

This plan is applicable to the immediate closure of abandoned waste collection trenches used for conducting partially treated wastewater to three earthen lagoons. A plan for the final disposition of those lagoons (e.g., closure, post-closure monitoring) is being developed separately by Mr. Steve Reed of Ed L. Reed & Associates, Inc., and shall be submitted to the Executive Director for approval upon completion of the necessary hydrogeologic investigation.

IMMINENT NEED

Whereas in August of 1981, a project for construction of a new building to house a plating line was submitted by Old Brazos Forge, Inc. to its parent corporation; the said building is to be constructed on the site of the heretofore abandoned trenches and contractual obligations required that construction begin the first week in May, 1982, there is an imminent need for prompt consideration of the provisions of this plan.

HISTORY

Old Brazos Forge, Inc. is a wire goods manufacturing facility which has been in existence since approximately 1965. In 1977, ownership passed to the present owners. The source of wastewater is an on-site plating facility which utilizes metal salts of copper, chromium, zinc and nickel. Waste treatment was provided through the chemical floculation of specific metals followed by the secondary clarification through the use of three large earthen lagoons. Wastewater was conducted to the lagoons from the plant facility through 4" PVC pipes bedded in open trenches. These trenches also served as storm drains to control rooftop run-off and the waste from several floor drains within the facility. Through normal usage, the soils around these trenches ultimately became contaminated to varying levels by the aforesaid metal salts. In late 1981, a 60' x 40' concrete and steel building structure was erected on part of the site which heretofore had been a part of the trench collection system. The building houses a "state-of-the-art" wastewater treatment system (TDWR Permit No. 02542) which replaces the trench system and the earthen lagoons. The treatment process removes the metals from the waste stream and discharges wastewater in which the contaminates are below discharge limits. The three wastewater lagoons will be closed in a manner which will safeguard the ground and surface waters in the area. Ed L. Reed & Associates has submitted a plan which is being used to evaluate the near surface soils and local hydrology in order to determine best method for closing the lagoons. Based on Mr. Reed's experience and initial findings, the following plan has been developed.

GEOLOGY

Old Brazos Forge is situated on the northwestern edge of the Fleming Formation outcorp. The Fleming Formation consists mostly of clay and silty clay with interbedded sand and sandstone. The Fleming Formation is estimated to be between 50' and 150' thick at this location. The plant site is about a mile from the contact between the Fleming Formation and the underlying Oakville Sandstone. The Oakville consists of fine to medium-grained sand with interbedded clay. Initial borings throughout the property indicated that the natural ground on which the site is located is a bentonitic clay of varying thickness from 7' to 14'. Beneath that is a shallow strata of sandy clay with underlying clays typical of the Fleming Formation.

HYDROLOGY

The plant site is situated on the western edge of the Burkeville aquiclude (clay) which corresponds to the upper Fleming Formation. The Jasper aquifer which is projected to lie at a depth of about 100' corresponds to the Oakville Sandstone.

Water levels in the vicinity of the Old Brazos Forge facility are about 150' below the surface. One water well at the plant site is a State observation well (59-53-501). This well, completed in 1964, was drilled to a depth of 292' and produces water from the Jasper aquifer. The water level measured in 1964 was 150' below the land surface.

The hydrologic gradient on the Jasper aquifer is toward the southeast at a rate of about 15' per mile. The base of the Jasper aquifer is approximately 800' below the land surface. This depth corresponds to the base of the Oakville Sandstone.

Ground water produced from the Jasper aquifer generally contains total dissolved solids (TDS) of less than 500 milligrams per liter (mg/l) in the vicinity of the plant site. A 1968 analysis of water from the well at the Old Brazos Forge showed a concentration of 29 mg/l chloride, 16 mg/l of sulfate and a TDS of 279 mg/l.

SOILS EVALUATION

Random soil samplings in the trench area indicate metal contamination of the fill soils (soils brought in and placed on top of natural soil to permit construction) in a manner that is neither uniform or consistent. Although leachate tests are being performed by Rollins Environmental Services, the results of those tests are not yet available and will not be available prior to the date of construction of the new building scheduled to begin. Based on the observations of soils data by Mr. Robert J. Bressett of the Texas Department of Water Resources District Office, it is felt that metals contained within the soils have stabilized and will not leach out. This will be further enhanced by the proposed immediate construction of a concrete slab and building which would totally cover the affected area, thus eliminating the inclusion of surface waters which may act as a carrier for any leachate. In addition, the immediate proximity is surrounded by six (6) ground water monitoring wells and one State observation well. Any contamination from this or any other source would be easily detectible.

THE CLOSURE PLAN

In consideration of the above information, economic impact (Old Brazos Forge, Inc. is a major employer in the Brenham area) and the deadlines imposed by contractual obligations (see letter dated April 23, 1982, attached as Exhibit "A"), it is proposed that the following steps be taken immediately by Old Brazos Forge, Inc. to provide closure of the aforesaid trenches and shield the ground and surrounding waterways from possible contamination due to rainfall which will serve to wash contaminated soils across the watershed:

(1) Transfer the piles of the contaminated soil excavated during the construction of the wastewater treatment building to one of the abandoned lagoons for storage. Ultimate disposition shall be accomplished in accordance with the plan developed by Ed L. Reed & Associates, subject to approval of the TDWR, for closure of the lagoons.

(2) Fill the excavated trenches with clay to prevent the infiltration of any water into the abandoned trench beds.

(3) Immediately construct a concrete building foundation having a polymeric vapor barrier beneath it on the entire site heretofore covered by the trenches. This building shall act as a hydrological "cap" to exclude surface water and prevent contaminate migration.

(4) Record the deed to the location of the site in the Deed Records of Washington County, Texas.

CONCLUSION

A separate Closure Plan shall be submitted by Old Brazos Forge, Inc. relating to closure of the earthen lagoons into which the wastewater collected by these trenches flows. Groundwater shall be monitored through the use of ground water monitoring wells in accordance with the provisions of the Texas Industrial Solid Waste Act. The results of such monitoring shall be submitted to the Texas Department of Water Resources. Because of the necessity to shield this area from rainwater, to prevent further contamination of the environment through the water-borne migration of contaminated soils, and to satisfy the legal contractual obligation of Old Brazos Forge, Inc. with its building contractor, Old Brazos Forge, Inc. shall immediately engage in the execution of this plan as herein presented unless otherwise directed by the Executive Director of the Texas Department of Water Resources or members of his staff authorized to act in his behalf. Such direction should be submitted directly to Mr. Mickey Walker, General Manager, Old Brazos Forge, Inc., P.O. Box 140, Brenham, TX 77833 with a copy to my attention at the address shown on the face of this plan. Inquiries relative to this plan or other environmental affairs of Old Brazos Forge, Inc. should be submitted directly to my office at the address shown on the face of this plan.

Respectfully submitted this 26th day of April, 1982.

[signature]

LAMAR GREEN

TEXAS DEPARTMENT OF WATER RESOURCES
1700 N. Congress Avenue
Austin, Texas

July 1, 1982

Mr. Mickey Walker, General Manager
Old Brazos Forge, Inc.
P. O. Box 140
Brenham, Texas 77833

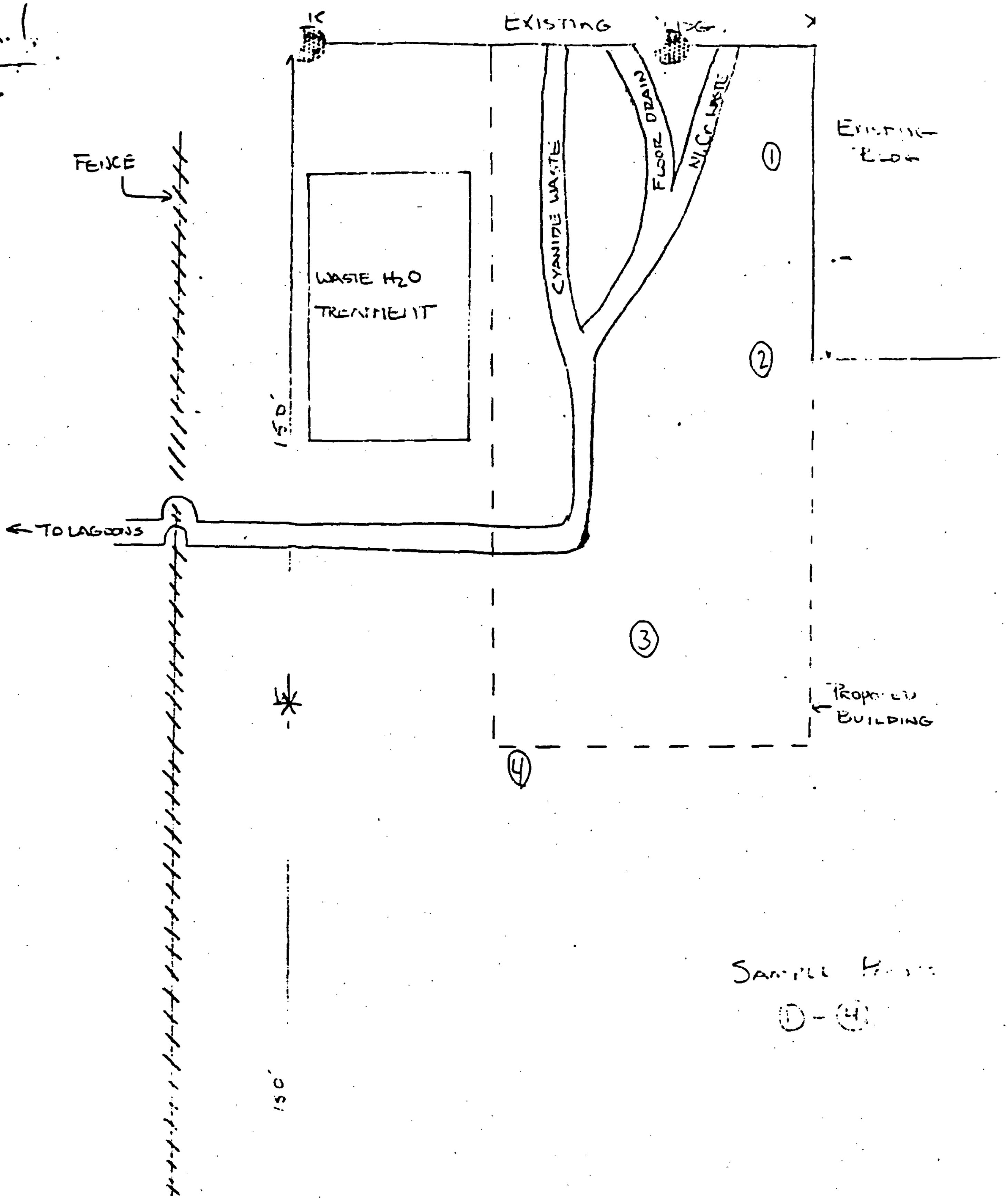
Dear Mr. Walker:

Re: Solid Waste Registration No. 30897
Partial Closure of Hazardous Waste Facility
Washington County

The Texas Department of Water Resources (TDWR) has received and reviewed letters from your consultant, Mr. Lamar Green, dated April 26, 1982 and June 15, 1982 pertaining to closure of certain hazardous waste components at Old Brazos Forge, Inc.'s facility in Brenham. The closure plan for the area in the vicinity of the abandoned waste collection trenches represents partial closure of hazardous waste facilities at the plant and has been evaluated pursuant to Texas Administrative Code (TAC) Section 335.6 (f) [TDWR Rule 156.22.01.105(f)] in Subchapter A of the Department's solid waste rules.

This letter, with the modifications detailed below, constitutes approval of the Executive Director of the closure plan described in the June 13 letter. This approved closure plan applies only to that area to be covered by the foundation for the building and the reinforced concrete pad as depicted on exhibit B to the June 15 letter. The area covered by the closure plan is a hazardous waste landfill and is subject to all applicable post-closure care requirements of the solid waste rules. The closure plan is modified to require certification by both the owner or operator and an independent registered professional engineer that the area has been closed in accordance with the approved closure plan. In the event that the owner or operator wishes to remove the building foundation or concrete pad that serves as a final cover for the landfill, notice shall be provided to the Department a minimum of 90 days prior to engaging in the activity to allow for evaluation of an appropriate replacement cover.

A.1


EXISTING BLDG.
FENCE
WASTE H_2O TREATMENT
CYANIDE WASTE
FLOOR DRAIN
WASTE
EXISTING BLDG
1
2
3
4
150'
TO LAGOONS
150'
PROPOSED BUILDING
SAMPLE
1 - 4

Page3

PARAMETERS	SAMPLE POINTS (RESULTS: mg/kg)											
TOTAL METALS	B	1	2	3	4	B 5	6	7	8	9	10	11
CADMIUM	<0.3	<0.4	<0.3	<0.3	<0.3	<0.3	<0.4	0.58	<0.4	<0.3	0.36	<0.3
LEAD	13	360	14	13	14	14	13	220	18	22	18	2.4
NICKEL	15	350	95	19	22	12	410	9.7	1070	420	430	24
ZINC	49	64	45	38	44	47	45	140	62	41	43	3.2
CHROMIUM	25	51	26	18	23	21	100	20	510	410	1130	25
COPPER	10	25	34	8.4	9.6	10	25	13	92	40	38	2.1

	SAMPLE POINTS (RESULTS: µg/l)											
LEACHATE	B	1	2	3	4	5	6	7	8	9	10	11
HEXAVALENT $Cr^{(+6)}$	<20	<20	<20	<20	<20	<20	<20	<20	<50	<100	<40	30
TOTAL CHROMIUM	<20	<20	<20	<20	<20	<20	<20	<20	200	510	150	30

NOTE:

Samples B thru B/5 were soil samples collected at approximately 15 inches. Samples 6 thru 11 were streambed samples collected 8 INCHES BELOW THE WATER LEVEL.

Ref. 7

Information Provided by: Len Klandrud (817) 778-6744
Texas Dept. of Health
2408 S. 37th
Temple, Texas 76504 - 7168

Name of Public Water Supply[1]	State Health ID#	Well Depths	Only Source or Alternate	Population Served
1. Large Water Company	2390018	440	Only Source	60
2. Oak Hill Acres	2390005	1,070	"	400
3. Bowlarama of Brenham and Coachlight West Inn	2390042	420	"	100
4. City of Brenham Well# 11	2390001	593	Alternate	11,000[2]
5. City of Brenham Well# 12	2390001	820	Alternate	11,000[2]
6. City of Brenham Well# 13	2390001	1,000	Alternate	11,000[2]

1 Locations documented on topographical map (Brenham, TX-1963 and Chappell Hill 1963).

2 Total population served from combination of City Wells# 11, 12, and 13.

RECORD OF COMMUNICATION	(Record of Item Checked Below) _x_Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify) Ref. 8	
TO: Larry Landry FIT Chemist Ecology and Environment, Inc. (214) 742-6601	From: Kermit A. Wahrmund District Conservationist 2305-A Becbel Drive Brenham, Texas 77833 (409) 830-7123	Date:July 12, 1988 Time:0820 hrs.-0830 hrs.

SUBJECT Irrigation, Coastal Wetland, Fresh-Water Wetland, Endangered*

SUMMARY OF COMMUNICATION

There is no surface water or groundwater well irrigation in Washington County. There are no coastal or freshwater wetlands in Washington County. Mr. Wahrmund had looked at over 400 pieces of property to conclude this information.

He is not aware of any endangered species in Washington Conty. Also, he has not seen any surface water use along Little Sandy Creek within 3 miles of the site area; however, the only possible use would be individuals (property owners along the Little Sandy Creek that might fish out of a pothole in the creek).

*Species, Little Sandy Creek in Washington County. (3-mile radius of the site).

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 9

BRENHAM

COMMUNITY DATA PROFILE

COUNTY: WASHINGTON STATE: TEXAS

Prepared by: Texas Department of Commerce

Print Date: 03/10/88 Last Update: 6/08/87

****

LOCATION

Nearest MSA:	BRYAN-COLLEGE STAT. MSA	Distance (miles):	38
Nearest Interstate:	I.H. 10	Distance (miles):	34.8
Nearest Major Hwy:	ST. HWY. 36	Distance (miles):	.0
TDOC Region Name:	GULF COAST	Average Elevation (feet):	350
Sq. Miles in City:	6.1	Sq. Miles in County:	594

POPULATION

	1980	1970	1960
City:	10,966	8,922	7,740
County:	21,998	18,842	19,145

Latest City Population Estimate: 12,900

CLIMATE

	Annual	January	July
Temperature Average:	68	49	84

Average Rainfall (inches): 38.9 Average Snowfall (inches): .6

Prevailing Wind: S-SOUTHEAST

COMMUNITY FACILITIES

Lodging:	Hotels	1	Rooms	33		
	Motels	5	Rooms	440		
Medical:	Hospitals	2	Beds	127	Doctors	30
	Clinics	4	Beds	0	Dentists	10

Number of Churches: 63

Recreational Facilities:

Type	Number
1. STATE PARK	1
2. MUSEUM	3
3. GOLF COURSE	2

EDUCATION

Number of School Districts in the County: 2

Major ISD in the City: BRENHAM I.S.D.

Total Enrollment (1-12): 4,125

Teachers: Elementary N/A Secondary 229 Voc-Sp. Ed. N/A

Number of Schools in the School District: 5

Total 12th Grade Enrollment: 199 Average SAT Score: 1005

Number of Private & Parochial Schools: 2

Number of Colleges (State & Private) Within 30 Miles: 2

Number of Public Library Volumes: 37,000

GOVERNMENT

Type of Government: MAYOR
Police Department Personnel Full Time: 26
Fire Department Personnel Full Time: 9 Volunteer: 60
Pieces of Equipment: 10 Fire Insurance Key Rate: $.17
Service Provided Outside City Limits or by County: YES

City Industrial Team:	YES	Chamber of Commerce:	YES
Economic Development Dept.:	YES	Industrial Development Corp.:	YES
Industrial Development Found.:	YES	Member Council of Govts:	YES
Planning Commission:	YES	Zoning Regulations:	YES

TRANSPORTATION

Railroads: 1. ATCHISON,TOPEKA&SANTA FE
2. NONE
3. NONE
Service Available: Piggyback? YES Switching? YES
Motor Freight Carriers: 1. CENTRAL FRT. 2. ROADWAY EXP. 3. RED ARROW
Number of Motor Freight Carriers with a Terminal in the City: 1
Total Number of Motor Freight Carriers Serving the City: 9
Air:
Nearest Airport: BRENHAM MUNICIPAL
Runway Length (ft): 4,000 Runway Surface: ASPHALT
Nearest Airport with Commercial Service: EASTERWOOD Distance(mi.): 50
Waterway: Nearest Deepwater Port HOUSTON
Channel Depth (feet): 40 Distance (miles): 74
Bus Service: 1. KERRVILLE 2. NONE
Parcel Service: 1. U.P.S. 2. TEX-PACK

UTILITIES

Electricity Distributor: 1. CITY OF BRENHAM 2. BLUEBONNET ELECT. COOP.
Water: Source 1. LAKE 2. WELLS
Max. Daily Capacity (MGPD): 3.50 Peak Load (MGPD): 4.00
Overhead Storage (MG): .90 Ground Storage (MG): 1.60
Basic Rate Per 1000 Gallons: N/A
Sewer: Type of Treatment Plant SECONDARY
Capacity (MGPD): 2.55 Present Load: 75%
Storm Sewer: YES Coverage 100% Sanitary Sewer: YES Coverage 100%
Basic Rate Per 1000 Gallons: N/A
Type of Solid Waste Disposal: LAND FILL
Natural Gas Distributor: 1. CITY OF BRENHAM 2. NONE

COMMUNICATION

Newspapers in City: Daily 1 Weekly 0
Largest Newspaper in City: BRENHAM BANNER-PRESS Circulation: 6,600
Radio Stations in City: 2 Television Stations in City: 1
Cable Television Available: YES Telephone Service: SOUTHWESTERN BELL/AT & T

FINANCIAL INSTITUTIONS

Banks:	4	Total Deposits: $	269,921,000
Savings & Loan:	3	Total Deposits: $	157,303,194

INDUSTRIAL PROPERTIES AVAILABLE

Name	Acres	Price Range/Per Acre	
1. BRENHAM INDUS. FOUND.	28	N/A -	N/A
2. BRENHAM INDUSTRIAL PARK	13	N/A -	N/A
3. PRIVATE REALTORS	N/A	N/A -	N/A

TAXES

Real Property	Rate/$100	Assessment Ratio
City:	.3532	100.00%
County:	.3164	100.00%
School:	.6500	100.00%

Total Effective Tax Rate: N/A

Local Nonproperty: City Retail Sales 1%

State Taxes: Corporate Income 0% | Retail Sales 6%

Individual Income 0% | Gasoline Tax $.15

Franchise Tax $6.70 (per $1000, $150 minimum)

LABOR ANALYSIS

Radius of the Labor Drawing Area (miles): 30

Estimated Labor Unemployed Male: 283 Female: 220

Total Annual High School Graduates: 200

Number of Work Stoppages in the Last Five Years: 0

Wage and/or Labor Survey Available: N/A

Latest County Unemployment Rate: 3.9%

Manufacturing Workers in Unions: 5 %

Union Security Contracts are Prohibited.

MAJOR EMPLOYERS

Name	Product	Employees Male	Employees Female	Year Estab.	Union
1. BLUEBELL CREAMERIES	ICE CREAM	374	164	1907	N/A
2. BRENTEX MILLS	COTTON CLOTH	217	108	1902	0%
3. BRENHAM WHOLESL. GROCERY	GROCERY DIST	198	22	N/A	0%
4. SEALY MATTRESS COMPANY	MATTRESSES	125	57	1956	0%
5. HUSSMANN/OLD BRAZOS	WIRE PRODUCT	77	43	1919	0%
6. STEADLEY COMPANY	MATTR. BOXES	90	20	1962	0%
7. GATES MOLDED RUBBER PRD.	RUBBER PROD.	81	29	1983	0%
8. VALMONT/A.L.S.	LIGHTNG.FIX.	43	8	1974	0%
9. CCT/FORMCRAFT	BUS. FORMS	49	14	N/A	0%

*-Included with Male Total

FOR ADDITIONAL INFORMATION

Name: MR. BRYAN F. SWEDLUND
Organization: CHAMBER OF COMMERCE
Address: 314 SOUTH AUSTIN
City: BRENHAM, TEXAS 77833
Telephone: 409/836-3695

TEXAS DEPARTMENT OF COMMERCE

WAGE RATES FOR SELECTED OCCUPATIONS

CITY OF

BRENHAM

OCCUPATION	HOURLY WAGE RATES Entry	Median	High
Bookkeeper	$6.29	$7.18	$8.09
Chemical Plant Operator	N/A	N/A	N/A
Common Laborer	$4.49	$5.23	$5.97
Draftsman	N/A	N/A	N/A
Electronics Technician	N/A	N/A	N/A
Forklift Operator	$6.17	$6.51	$6.85
Lathe Operator	N/A	N/A	N/A
Machine Operator	$5.83	$6.77	$7.65
Machinist	$7.83	$8.75	$9.66
Maintenance Electrician	$9.23	$10.31	$11.39
Maintenance Mechanic	$7.70	$8.91	$10.13
Office Clerk	$4.94	$5.60	$6.27
Porter / Custodian	N/A	N/A	N/A
Production Assembler	$5.79	$6.77	$7.76
Secretary	$6.03	$7.17	$8.32
Sewing Machine Operator	N/A	N/A	N/A
Shipping & Receiving Clerk	$5.17	$6.10	$7.03
Tool and Die Maker	N/A	N/A	N/A
Truck Driver	$6.83	$7.50	$8.17
Welder	$6.93	$8.08	$9.23

* N/A: Information not available

Ref. 10

Texas Water Commission

INTEROFFICE MEMORANDUM

TO : Luis Campos, Field Operations Liaison
Field Operations Division

DATE: May 27, 1987

THRU :

FROM : Paula Thetford, Hazardous and Solid Waste Specialist
Southeast Region, Deer Park Office

SUBJECT: Sample Results, Old Brazos Forge, ISW Registration #30897

On December 12, 1986, the streambed below the outfall at Old Brazos Forge was sampled to determine levels of contamination in the soil. Attached are the results and a letter to the company.

This is provided for your information.

Signed: Paula R. Thetford
Paula Thetford

Approved: Tom Kearns
Tom Kearns

TK/PT/np

	BG	S-1	S-2	S-3	S-4	S-5	S-6	S-7
Pb(Total)	50	76	81	37	71	66	37	49
Pb(EP-tox)	.032	<.01	<.01	<.01	<.01	.036	.042	<.01
Pb(TDWR)	<.01	.053	<.01	.087	<.01	.01	<.01	<.01
Cr(total)	24	122*	54	124*	800*	1310*	58,000*	88*
Cr(EP-tox)	.008	.024	.008	.026	.048	.05	.064	.016
Cr(TDWR)	<.008	.031	.021	.014	.141	.088	.043	.04
Ni(total)	16	323*	111*	206*	970*	4470*	98*	830*
Zn(total)	32	107*	39	28	67*	145*	419*	396*
Cu(total)	<.1	48*	5	32*	144*	507*	75*	58*

BG = background
S-1 = at outfall feet
S-2 = 50 yds downstream from outfall
S-3 = 100 yds downstream from outfall
S-4 = 150 yds downstream from outfall
S-5 = 200 yds downstream from outfall
S-6 = 250 yds downstream from discharge at Hwy 36
5-7 = near driveway downslope from sludge bin

All data shown in ppm
*Significantly higher than background

TEXAS WATER COMMISSION

Paul Hopkins, Chairman
Ralph Roming, Commissioner
John O. Houchins, Commissioner

Larry R. Soward, Executive Director
Mary Ann Hefner, Chief Clerk
James K. Rourke, Jr., General Counsel

May 27, 1987

Mr. Dennis M. Barron,
General Manager
Old Brazos Forge, Inc.
P. O. Box 140, Loop 36 NW
Brenham, Texas 77833

Dear Mr. Barron:

RE: Streambed sample results

On December 12, 1986, samples of the sediment in the streambed below your outfall were collected and subsequently analyzed for heavy metals. For each parameter, three analytical methods were used: the EP-toxicity test,the TDWR leachate test, and the total metal analysis. One background sample was taken upstream from the outfall. Six other samples were taken downstream of the outfall at approximately 50 yds. apart. One additional sample was taken near the loading docks where there is visual evidence of runoff from your sludge bins.

The sample results are tabulated on the attached sheet. At this time, we request that you respond by June 30, 1987 with your plans pertaining to the remediation of this problem. If you have any questions, please feel free to contact Paula Thetford at (713) 479-5981.

Sincerely,

Tom Kearns
Manager
Hazardous and Solid Waste
Southeast Region
Deer Park Office

TK/PT/np

cc: Mr. Robert Miller
Hussman Corporation
12999 St. Charles Rock Rd.
Bridgeton, Mo. 63044

NEW [X] UPDATE [ ]

FY '87 COMPLIANCE MONITORING AND ENFORCEMENT LOG

Reviewer: BAB - LLB
Facility:
FSS:
HWDMS data entry:

TWC # 30897 EPA ID # TX D048901235 DISTRICT 07 INSPECTOR PRT
(IF NONE, was EPA Form 8700-12 provided? Y __ N __)

Handler Name Old Brazos Forge

Site Address Loop 38 N.W. Brenham, TX 77833 (TWC Permit # __________) if applicable

Sequence: 0

DATE OF INITIAL EVALUATION: 12/12/87
mm dd yy

TYPE OF EVALUATION: 02

No. of Samples: 7

01 = CEI	05 = Follow-Up
02 = Sampling	09 = Closure
03 = Record Review	10 = Other Inspection
04 = CME	11 = Case Development
	SW = Non-hazardous Solid Waste
	SP = Special Inspection(SI)

SEQ

RA: 9

Evaluation Comment: sampling showed contamination of the streambed below the outfall

AREA OF VIOLATION

CLASS	GW	CP (CL)	FR (FI)	PT.B	SC	MA	OT
1							
2							
3 (STATE)							X

CLASS & VIOLATION

Enter in appropriate box:

'X' if violation found

'O' if no violation found

'Z' if same as last year or violation determination pending

Review Committee:
Start Enforcement:
HPV? Y N Date:
ENF data entry:

Violation Comment:

ENFORCEMENT ACTIONS:
Enter Class, Type, and applicable dates

DATE REFERRED TO CENTRAL OFFICE ________ New ___ Update ___

CLASS	AREA	seq.	TYPE	DATE mm/dd/yy	RA	COMPLIANCE SCHED. DATE mm/dd/yy	COMPLIANCE ACTUAL DATE mm/dd/yy	PENALTIES ASSESSED	PENALTIES COLLECTED
	GW								
	CP								
	FR								
	Pt.B								
	SC								
	MA								
	OT		03						

TYPE
Enforcement codes:

03 = NOV Sent
04 = TWC Complaint Filed
05 = TWC Final Order Issued
10 = Informal Action
11 = Civil Action Filed
14 = EPA Referral
15 = Corrective Action Order
19 = Final Judicial Order

Enforcement Comment :

[illegible signature]

1.0

TWC Reg. No.________

TEXAS WATER COMMISSION

Solid Waste Compliance Monitoring Inspection Report

C.O. Use Only

INSPECTION COVER SHEET

TWC District 07

EPA ID No. TXD018901235 COMMERCIAL WASTE FACILITY___ GOVT. FACILITY___

NAME OF COMPANY Old Brazos Forge

MAILING ADDRESS P.O. Box 1410 Brenham 77833 Tel (409)836-5626

SITE LOCATION Loop 36 N.W. Brenham Tel. same

COUNTY Washington TYPE OF INDUSTRY manufacture wire shelving & plating w/chrome, brass & zinc

GENERATOR CLASSIFICATION: Industrial___ Municipal___

Part A Permit Application submitted to the State? Yes ✓ No___ To EPA? Yes___ No___

Affidavit of Exclusion submitted to TWC? Yes ✓ No___

Was a written exclusion granted by TWC? N/A___ Yes ✓ No___ ...If yes, Date:______

Will this facility require a RCRA permit? Yes___ No ✓

CURRENT WASTE MANAGEMENT (Haz.-"H"; Class I NonHaz.-"NH"; Class II-"II"; Class III-"III")

Generator H, NH, II Treatment________ Storage NH, II Disposal________ Transporter_____

HW EXEMPTIONS: 90-Day Storage ✓ Other________

SQG___: Total HW Generation Per Month: <100 kg.___ 100-1000 kg.___

H W Facilities (circle facility codes): C T SI (closed) WP LT LF I TT TR WDW O

N H Facilities (circle facility codes): C T SI WP LT LF I TT TR WDW O

Anomalies in the above information will be addressed by: (a) Enforcement in progress___, (b) Owner/Operator___, (c) District Office ✓ (d) Central Office___.

Type of Inspection (circle): CEI SQG CL CD SA OT FO SP

Inspector's Name and Title Paula Thetford, Hazardous & Solid Waste Specialist

Inspection Participants Neil Billeaudeaux, TWC

Date(s) of Inspection 12-12-87

Signed: Paula K Thetford 5-21-87
Inspector Date

Approved: [signature]
District Manager

04/87

STANDARD LEVELS FOR HEAVY METALS *

	Average Background Levels in Soils	TWC Alert Levels In Soils	EP Toxicity Level (EP Tox. params)	EPA Drinking Water Act	Secondary Drinking Water Act	Discharge Limit to Inland Surface Water	Discharge Limit to Tidal Surface Water
Arsenic	6	5	5.0	0.05	0.05	0.3	0.3
Barium	430	500	100	1.0	1.0	4.0	4.0
Cadmium	0.06-0.5	2	1.0	0.01	0.01	0.2	0.3
Chromium	100	100	5.0	0.05	0.05	5.0	5.0
Copper	20	50	-	-	1.0	2.0	2.0
Fluorine	200	-	-	-	-	-	-
Fluoride	-	-	-	1.4-2.4	-	-	-
Iron	-	-	-	-	0.3	-	-
Lead	10	~~50~~ 1000	5.0	0.05	0.05	1.5	1.5
Manganese	850	900	-		0.05	3.0	3.0
Mercury	0.03	1	0.2	0.002	0.002	0.01	0.01
Nickel	40	50	-	-	-	3.0	3.0
Selenium	0.2-0.5	-	1.0	0.01	0.01	0.2	0.3
Silver	-	5	5.0	0.05	0.05	0.2	0.2
Strontium	300	-	-	-	-	-	-
Zinc	50	75	-	-	5.0	6.0	6.0

* All measurements are reflected in ppm.

RECORD OF COMMUNICATION	(Record of Item Checked Below) _x_Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify) Ref. 11	
TO: Alphonse Kubecgka Water Production Manager Brenham, Texas (409) 836-3751	From: Larry K. Landry, FIT Chemist Ecology and Environment, Inc Dallas, Texas 75201 (214) 742-6601	Date: July 13, 1988 Time: 1348 hrs.- 1353 hrs.

SUBJECT Population served by surface water and City Wells 11, 12, and 13.

SUMMARY OF COMMUNICATION

Mr. Kubecgka is not aware of any population served by water supply intake within three miles of the site area.

City Wells 11, 12, 13 are used only when there is a break in the pipe lines that can't be repaired in a 24-hour period. Before the Fall 1987, the City Wells 11, 12, and 13 were used approximately twice a year because the demand for water was greater than the amount provided by Lake Somerville.

City Wells supply approximately 11,000 gals. when in operation.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Notification of Hazardous Waste Site — Side Two

F Waste Quantity:

Place an X in the appropriate boxes to indicate the facility types found at the site.

In the "total facility waste amount" space give the estimated combined quantity (volume) of hazardous wastes at the site using cubic feet or gallons.

In the "total facility area" space, give the estimated area size which the facilities occupy using square feet or acres.

Facility Type

1. ☐ Piles
2. ☐ Land Treatment
3. ☐ Landfill
4. ☒ Tanks
5. ☐ Impoundment
6. ☐ Underground Injection
7. ☐ Drums, Above Ground
8. ☐ Drums, Below Ground
9. ☐ Other (Specify) ______

Total Facility Waste Amount

cubic feet ______

gallons 1000

Total Facility Area

square feet ______

acres ______

G Known, Suspected or Likely Releases to the Environment:

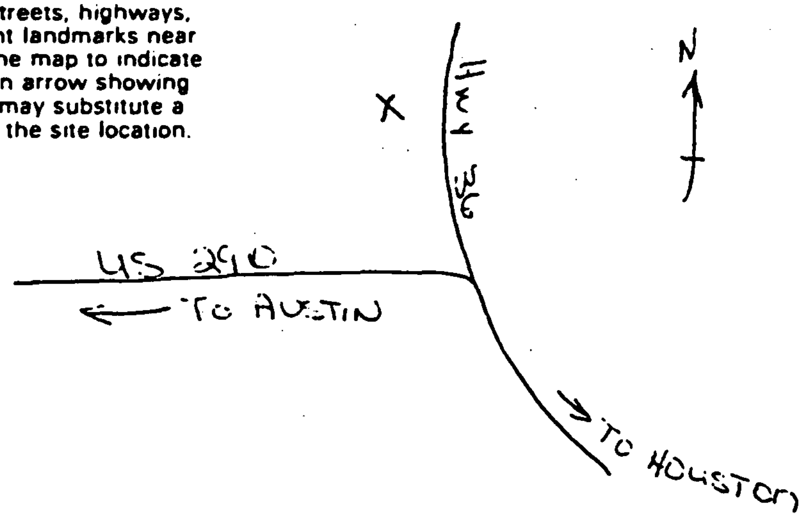
Place an X in the appropriate boxes to indicate any known, suspected, or likely releases of wastes to the environment.

☐ Known ☐ Suspected ☐ Likely ☒ None

Note: Items H and I are optional. Completing these items will assist EPA and State and local governments in locating and assessing hazardous waste sites. Although completing the items is not required, you are encouraged to do so.

H Sketch Map of Site Location: (Optional)

Sketch a map showing streets, highways, routes or other prominent landmarks near the site. Place an X on the map to indicate the site location. Draw an arrow showing the direction north. You may substitute a publishing map showing the site location.



I Description of Site: (Optional)

Describe the history and present conditions of the site. Give directions to the site and describe any nearby wells, springs, lakes, or housing. Include such information as how waste was disposed and where the waste came from. Provide any other information or comments which may help describe the site conditions.

Wire goods Manufacturing Plant

Page2

J Signature and Title:

The person or authorized representative (such as plant managers, superintendents, trustees or attorneys) of persons required to notify must sign the form and provide a mailing address (if different than address in item A). For other persons providing notification, the signature is optional. Check the boxes which best describe the relationship to the site of the person required to notify. If you are not required

Name Edward Lamar Green, Agent

Street 12605 East Freeway - Suite 509

City Houston State Tx Zip Code 77015

Signature [signature] Date 5/28/81

☐ Owner, Present
☐ Owner, Past
☐ Transporter
☐ Operator, Present
☐ Operator, Past
☒ Other

federal register

Monday
May 19, 1980

Environmental Protection Agency

Hazardous Waste and Consolidated Permit Regulations

P0003

§ 261.31 Hazardous waste from nonspecific sources.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The spent halogenated solvents used in degreasing, tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and the chlorinated fluorocarbons; and sludges from the recovery of these solvents in degreasing operations.	(T)
F002	The spent halogenated solvents, tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, o-dichlorobenzene, trichlorofluoromethane and the still bottoms from the recovery of these solvents.	(T)
F003	The spent non-halogenated solvents, xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, n-butyl alcohol, cyclohexanone, and the still bottoms from the recovery of these solvents.	(I)
F004	The spent non-halogenated solvents, cresols and cresylic acid, nitrobenzene, and the still bottoms from the recovery of these solvents	(T)
F005	The spent non-halogenated solvents, methanol, toluene, methyl ethyl ketone, methyl isobutyl ketone, carbon disulfide, isobutanol, pyridine and the still bottoms from the recovery of these solvents.	(I, T)
F006	Wastewater treatment sludges from electroplating operations	(T)
F007	Spent plating bath solutions from electroplating operations	(R, T)
F008	Plating bath sludges from the bottom of plating baths from electroplating operations	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations	(R, T)
F010	Quenching bath sludge from oil baths from metal heat treating operations	(R, T)
F011	Spent solutions from salt bath pot cleaning from metal heat treating operations	(R, T)
F012	Quenching wastewater treatment sludges from metal heat treating operations	(T)
F013	Flotation tailings from selective flotation from mineral metals recovery operations	(T)
F014	Cyanidation wastewater treatment tailing pond sediment from mineral metals recovery operations	(T)
F015	Spent cyanide bath solutions from mineral metals recovery operations	(R, T)
F016	Dewatered air pollution control scrubber sludges from coke ovens and blast furnaces	(T)

§ 261.32 Hazardous waste from specific sources.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Wood Preservation: K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol	(T)
Inorganic Pigments:		
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments	(T)
K003	Wastewater treatment sludge from the production of molybdate orange pigments	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments	(T)
K008	Oven residue from the production of chrome oxide green pigments	(T)
Organic Chemicals:		
K009	Distillation bottoms from the production of acetaldehyde from ethylene	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile	(R, T)
K012	Still bottoms from the final purification of acrylonitrile in the production of acrylonitrile	(T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile	(T)
K015	Still bottoms from the distillation of benzyl chloride	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin	(T)
K018	Heavy ends from fractionation in ethyl chloride production	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production	(T)
K022	Distillation bottom tars from the production of phenol/acetone from cumene	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene	(T)
K026	Stripping still tails from the production of methyl ethyl pyridines	(T)
K027	Centrifuge residue from toluene diisocyanate production	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane	(T)
K029	Waste from the product stream stripper in the production of 1,1,1-trichloroethane	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene	(T)
Pesticides:		
K031	By-products salts generated in the production of MSMA and cacodylic acid	(T)
K032	Wastewater treatment sludge from the production of chlordane	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane	(T)
K035	Wastewater treatment sludges generated in the production of creosote	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton	(T)
K037	Wastewater treatment sludges from the production of disulfoton	(T)
K038	Wastewater from the washing and stripping of phorate production	(T)
K039	Filter cake from the filtration of diethylphosphorodithoric acid in the production of phorate	(T)
K040	Wastewater treatment sludge from the production of phorate	(T)
K041	Wastewater treatment sludge from the production of toxaphene	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds	(T)
K047	Pink/red water from TNT operations	(R)
Petroleum Refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
Leather Tanning Finishing:		
K053	Chrome (blue) trimmings generated by the following subcategories of the leather tanning and finishing industry: hair pulp/chrome tan/retan/wet finish; hair save/chrome tan/retan/wet finish; retan/wet finish; no beamhouse; through-the-blue; and shearling.	(T)

Ref 12

SE

EPA Notificati . of Hazardous Waste ite

United States Environmental Protecti

RECEIVED

Washington DC 20460

TXS-000-001-099 000444

JUN 10 1981

6AEP

This initial notification information is *required by* Section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 and must be mailed by June 9, 1981.

Please type or print in ink. If you need additional space, use separate sheets of paper. Indicate the letter of the item which applies.

A Person Required to Notify:

Enter the name and address of the person or organization required to notify.

Name OLD BRAZOS FORGE, INC.

Street P.O. Box 140

City Brenham State Texas Zip Code 77833

B Site Location: TXD 04-890 1235

Enter the common name (if known) and actual location of the site.

HAZ-TX10561 or

Name of Site OLD BRAZOS FORGE, INC.

Street Hwy # 36 - North edge of town

City Brenham County Washington State Texas Zip Code 77833

C Person to Contact:

Enter the name, title (if applicable), and business telephone number of the person to contact regarding information submitted on this form.

Name (Last, First and Title) Mickey Walker

Phone (713) 838-5626

D Dates of Waste Handling:

Enter the years that you estimate waste treatment, storage, or disposal began and ended at the site.

From (Year) 1977 To (Year) ~~Present~~ 1981

E Waste Type: Choose the option you prefer to complete

Option I: Select general waste types and source categories. If you do not know the general waste types or sources, you are encouraged to describe the site in Item I—Description of Site.

General Type of Waste:
Place an X in the appropriate boxes. The categories listed overlap. Check each applicable category.

1. ☐ Organics
2. ☐ Inorganics
3. ☐ Solvents
4. ☐ Pesticides
5. ☒ Heavy metals
6. ☐ Acids
7. ☐ Bases
8. ☐ PCBs
9. ☐ Mixed Municipal Waste
10. ☐ Unknown
11. ☐ Other (Specify)

Source of Waste:
Place an X in the appropriate boxes.

1. ☐ Mining
2. ☐ Construction
3. ☐ Textiles
4. ☐ Fertilizer
5. ☐ Paper/Printing
6. ☐ Leather Tanning
7. ☐ Iron/Steel Foundry
8. ☐ Chemical, General
9. ☒ Plating/Polishing
10. ☐ Military/Ammunition
11. ☐ Electrical Conductors
12. ☐ Transformers
13. ☐ Utility Companies
14. ☐ Sanitary/Refuse
15. ☐ Photofinish
16. ☐ Lab/Hospital
17. ☐ Unknown
18. ☐ Other (Specify)

Option 2: This option is available to persons familiar with the Resource Conservation and Recovery Act (RCRA) Section 300 regulations (40 CFR Part 261).

Specific Type of Waste:
EPA has assigned a four-digit number to each hazardous was listed in the regulations under Section 3001 of RCRA. Enter t appropriate four-digit number in the boxes provided. A copy c the list of hazardous wastes and codes can be obtained by contacting the EPA Region serving the State in which the site located.

F006		
F007		
F008		
F014		

Form Approved
OMB No. 2000-0138

Page 1

Ref. 13

TEXAS WATER COMMISSION

July 6, 1988

Mr. Larry Landry
Ecology and Environment, Inc.
1509 Main Street, Suite 1400
Dallas, Texas 75201

RE: Old Brazos Forge, Permit No. 30897

Dear Mr. Landry:

Pursuant your request you will find the designated sample locations for the October 9, 1984 sampling event designated on the attached topographical map. In addition, following is a description of each sample location.

1. Samples collected from stream bed of northwest corner of O.B.F property. This was the background sample (sample tag is incorrectly labeled as northeast).

2. Samples collected at the point of discharge from 4 inch effluent line into stream bed on O.B.F. property.

3. Samples collected from stream bed half way between the discharge point into the stream and S.H. 36 on O.B.F. property.

4. Samples collected in pooled area in State owned right of way on northside of S.H. 36. The area is located between the (fence) O.B.F. property line and the culvert under S.H. 36.

4B. Samples collected in pooled area in State owned right of way on the southside of S.H. 36.

5. Samples collected on private property 80 yards west of S.H. 36 from stream bed at the point where the direction of the stream changes from west to north west.

6. Samples collected at northeast property line of cow pasture (approximately 0.25 mile northeast of S.H. 36) at the point where the stream flowed into a larger tributary of Sandy Creek.

P. O. Box 13087 Capitol Station • 1700 North Congress Ave. • Austin, Texas 78711-3087 • Area Code 512/463-7830

The stream bed was a well defined stream bed except at locations 4, 4B, and 5 where the water pooled and deposited sediments.

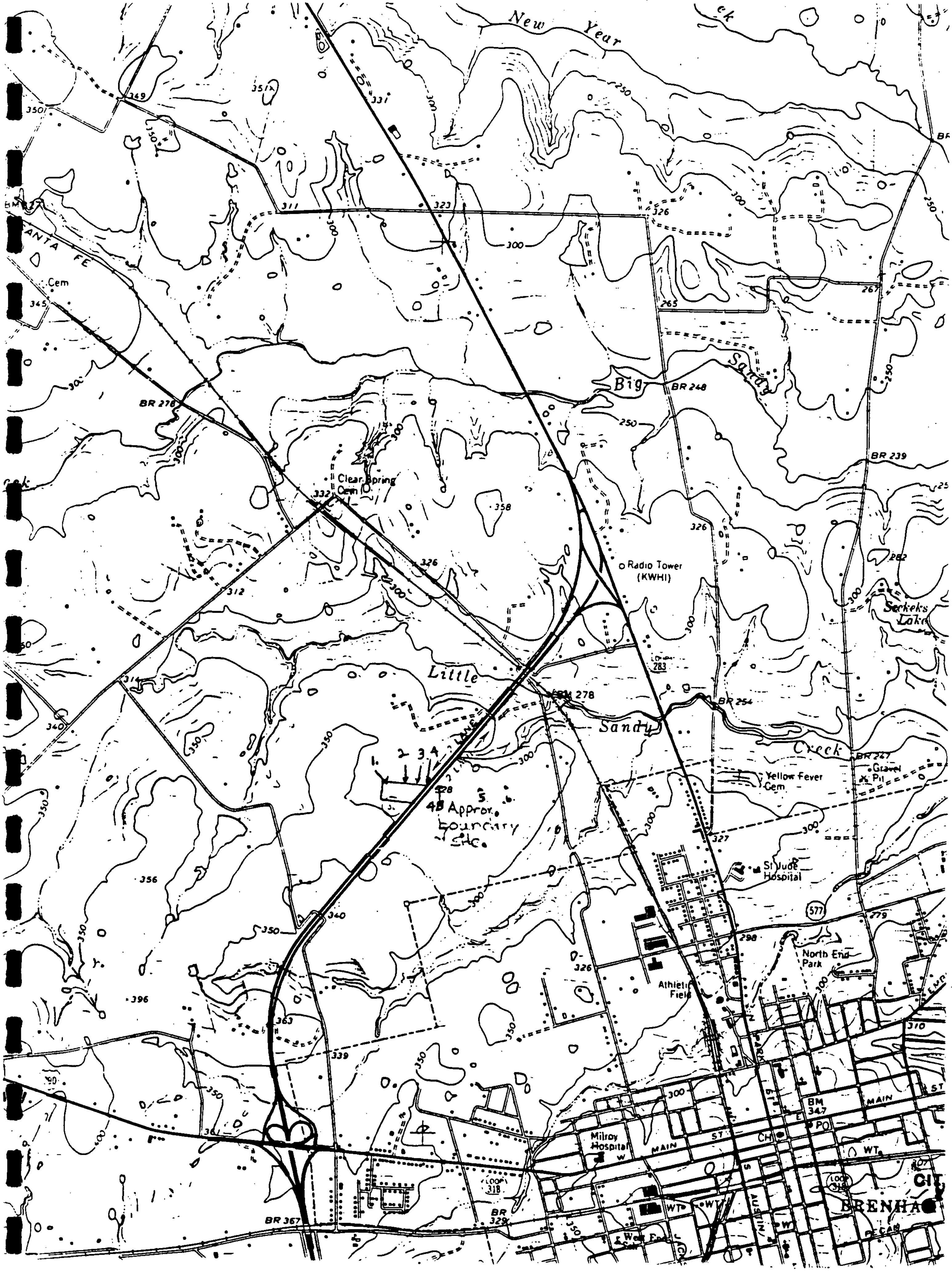
If I may provide additional data, please call.

Sincerely,

Eddie E. Abshire

Eddie E. Abshire
Water Quality Manager
South District
Southeast Region

EEA/amh



New Year
Santa Fe
Cem
Big
Sandy
Clear Spring Cem
Radio Tower (KWHI)
Serkeks Lake
Little
Sandy
Creek
Lane
1 2 3 4
5 6
48 Approx. boundary site
Yellow Fever Cem
Gravel Pit
St Jude Hospital
North End Park
Athletic Field
Milroy Hospital
Main St
West End
Austin
Pecan
Brenham

- 9062/543 Base: "8" depth #1

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04239 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:05AM

Plant Name Point of Collection Base data Streambed

Method of Flow Measurement 8" below streambed - SW property line

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT SAMP (20)
02542	001	6	10	09	84	SG

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04238 District 13

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations rain prior to sample

Lab. Used TRA Lab. No. 84-1622 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (~~ug/l~~) mg/Kg		Chromium (~~ug/l~~) mg/Kg		Copper (~~ug/l~~) mg/Kg	
01027	<0.2	01034	126	01042	49
Lead (~~ug/l~~) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	55	01055		71900	
Nickel (~~ug/l~~) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	515	01147		01077	
Zinc (~~ug/l~~) mg/Kg		[illegible]		Cr Total	
01092	[illegible]				

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04239 OCT 15 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:05AM

Plant Name ______ Point of Collection Base data Streambed

Method of Flow Measurement ______ 8" below streambed - SW property line

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1 – 9)	PAGE NO. (10 – 12)	CARD TYPE (13)	DATE Mo. (14 15)	Day (16 17)	Yr. (18 19)	MAT. SAMP. (20)
02542	001	B	10	09	84	S

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04238 DEC 20 1984 District 13

Type Sample: Heavy Metals

Grab ✓ Composite ______ Hr.

Observations rain prior to sample

Lab. Used TRA Lab. No. 84-1622 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (~~ug/l~~) mg/Kg		Chromium (~~ug/l~~) mg/Kg		Copper (~~ug/l~~) mg/Kg	
01027	<0.2	01034	126	01042	49
Lead (~~ug/l~~) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	55	01055		71900	
Nickel (~~ug/l~~) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	515	01147		01077	
Zinc (~~ug/l~~) mg/Kg		~~0.05~~		Cu Total	
01092	70				

No. HM 04239

District 13

County Washington Basin Brazos

Discharger Name Old Brazos Forge

Time Collected 11:15 AM

Plant Name

Point of Collection Streambed at point of discharge

Method of Flow Measurement

Chlorine Contact Time n/a

Date Shipped 10 - 10 - 84

Collector's Signature [illegible]

PERMIT NUMBER (1 – 9)	PAGE NO. (10 – 12)	CARD TYPE (13)	DATE Mo. (14 15)	DATE Day (16 17)	DATE Yr. (18 19)	MAT. SAMP. (20)
02542	001	B	10	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
~~Flow (gpd)~~		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04239

District 13

Type Sample: Heavy Metals

Lab. Used TRA

Lab. No. 84-1624 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab

Composite Hr.

Type Facility metal plating

Observations rain prior to sampling

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	670	01042	710
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	163	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	970	01147		01077	
Zinc (ug/l) mg/Kg					
01092	560				

No. HM 04239

District 13

County [illegible] Basin Brazos

Discharger Name Old Brazos [illegible]

Time Collected 11:15 am

Plant Name

Point of Collection Streambed at point of discharge

Method of Flow Measurement

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT. SAMP. (20)
02542	001	6	10	09	84	SE

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
~~Flow (gpd)~~		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04239

District 13

Type Sample: Heavy Metals

Lab. Used TRA

Lab. No. 84-1624 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab

Composite Hr.

Type Facility metal plating

Observations rain prior to sampling

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	670	01042	710
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	63	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	970	01147		01077	
Zinc (ug/l) mg/Kg		~~[illegible]~~		[illegible]	
01092	560				

TEXAS DEPARTMENT OF WATER RESOURCES

9062/543

"8" depth #2

No. HM 04240 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:20 AM

Plant Name Point of Collection 8" below streambed at point of discharge #2

Method of Flow Measurement n/a

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
02542	001	8	10	09	84	SB

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature Eddie J. Wilkie

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04240 District 13

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations rain prior to sample

Lab. Used TRA Lab. No. 84-1625 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature W M Flynn

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium ~~(ug/l)~~ mg/kg		Chromium ~~(ug/l)~~ mg/kg		Copper ~~(ug/l)~~ mg/kg	
01027	<0.2	01034	114	01042	77
Lead ~~(ug/l)~~ mg/kg		Manganese (ug/l)		Mercury (ug/l)	
01051	50	01055		71900	
Nickel ~~(ug/l)~~ mg/kg		Selenium (ug/l)		Silver (ug/l)	
01067	126	01147		01077	
Zinc ~~(ug/l)~~ mg/kg		~~[illegible]~~		cu Total	
01092	84				

9062/543 Surface #3

TEXAS DEPT. OF WATER RESOURCES

No. HM 04241 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:30 AM

Plant Name Point of Collection Surface of streambed half way between pt of discharge + SHW 36

Method of Flow Measurement n/a

PERMIT NUMBER (1 – 9)	PAGE NO. (10 – 12)	CARD TYPE (13)	DATE Mo. (14 15)	Day (16 17)	Yr. (18 19)	MAT. SAMP. (20)
02542	001	B	10	09	84	SB

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature Eddie [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04241 District 13

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations

Lab. Used TRA Lab. No. 84-1626 Hm

Material Sampled: Raw, Partially Treated, Final, Stream bed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium ~~(ug/l)~~ Mg/Kg		Chromium ~~(ug/l)~~ mg/Kg		Copper ~~(ug/l)~~ mg/Kg	
01027	<0.2	01034	530	01042	328
Lead ~~(ug/l)~~ mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	30	01055		71900	
Nickel ~~(ug/l)~~ mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	2120	01147		01077	
Zinc ~~(ug/l)~~ mg/Kg				Cr Total	

Surface #3

TEXAS DEPT. OF WATER RESOURCES

No. HM 04241 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:30 AM

Plant Name Point of Collection Surface of streambed half way between pt of discharge + SHW 36

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14 15)	Day (16 17)	Yr. (18 19)	MAT. SAMP. (20)
02542	001	B	10	09	84	S

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04241 District 13

Type Sample: Heavy Metals

Grab ✓ Composite Hr.

Observations

Lab. Used TRA Lab. No. 84-1626 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation Ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (~~ug/l~~) Mg/Kg		Chromium (~~ug/l~~) Mg/Kg		Copper (~~ug/l~~) Mg/Kg	
01027	<0.2	01034	530	01042	328
Lead (~~ug/l~~) Mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	30	01055		71900	
Nickel (~~ug/l~~) Mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	2120	01147		01077	
Zinc (~~ug/l~~) Mg/Kg				Cr Total	
01092	486				

9062 | 543 8" deep #3

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04242 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:40 AM

Plant Name Point of Collection 8" below surface halfway between pt of discharge + SHW 36

Method of Flow Measurement n/a Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
02542	001	B	10	09	84	S0

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04242 District 13

Type Sample: Heavy Metals

Grab ✓ Composite ____ Hr.

Observations rain prior to sampling

Lab. Used ____ Lab. No. 84-1620 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	108	01042	41
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	<1.0	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	214	01147		01077	
Zinc (ug/l) mg/Kg		~~Cr[illegible]~~		Cr Total	
01092	71				

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04242 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11 40 AM

Plant Name Point of Collection 8" below surface halfway

Method of Flow Measurement n/a between pt of discharge & SH 36

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER 1 – 9	PAGE NO. 10 – 12	CARD TYPE 13	DATE Mo. 14 15	Day 16 17	Yr. 18 19	MAT. SAMP. 20
02542	001	6	10	09	84	50

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04242

Type Sample: Heavy Metals

District 13

Lab. Used Lab. No. 84-1620 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab ✓ Composite Hr.

Type Facility metal plating

Observations rain prior to sampling

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	108	01042	41
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	<11.0	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	214	01147		01077	
Zinc (ug/l) mg/Kg		~~[illegible]~~		Cu Total	
01092	71				

TEXAS DEPARTMENT OF WATER RESOURCES

Sample #4
Sidestream

No. HM 04245 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 12:00 noon

Plant Name ______ Point of Collection surface of streambed on

Method of Flow Measurement n/a small sidestream @ north side State Highway 36

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	DATE Day	DATE Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
02542	001	B	10	09	84	SB

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature Eddie D. Olbr...

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04245 District 13

Type Sample: Heavy Metals

Grab ✓ Composite ______ Hr.

Observations rain @ time of sample
multi-color sediment

Lab. Used TRA Lab. No. 84-1645 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature W.M.B. Cyrus

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/kg		Chromium (ug/l) mg/kg		Copper (ug/l) mg/kg	
01027	<0.2	01034	7800	01042	4000
Lead (ug/l) mg/kg		Manganese (ug/l)		Mercury (ug/l)	
01051	27	01055		71900	
Nickel (ug/l) mg/kg		Selenium (ug/l)		Silver (ug/l)	
01067	4100	01147		01077	
Zinc (ug/l) mg/kg		Cr+6 mg/kg BASIC LEACHATE		Cr Total	
01092	11800		1.98		

TEXAS DEPARTMENT OF WATER RESOURCES   4062-1543   Surface #4

No. HM 04243

District 13   County Washington   Basin Brazos

Discharger Name Old Brazos Forge   Time Collected ~~[illegible]~~ 11:50 AM

Plant Name

Point of Collection surface of stream bed @SH#36 (northside)

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
025A2001	B	0	00	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
~~Flow~~ (gpd)		~~Water Temperature~~ (°F)		~~pH~~	
00056		00011		00400	
~~D.O.~~ (mg/l)		~~Turbidity~~ (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04243 JAN 04 [illegible]   District 13

Type Sample: Heavy Metals

Grab ✓   Composite ____ Hr.

Observations raing @ time of sample multicolor sludges

Lab. Used TRA   Lab. No. 84-1621 HM

Material Sampled: Raw, Partially Treated, Final, Stream bed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/kg		Chromium (ug/l) mg/kg		Copper (ug/l) mg/kg	
01027	<0.2	01034	4450	01042	3050
Lead (ug/l) mg/kg		Manganese (ug/l)		Mercury (ug/l)	
01051	<1.0	01055		71900	
Nickel (ug/l) mg/kg		Selenium (ug/l)		Silver (ug/l)	
01067	24050	01147		01077	
Zinc (ug/l) mg/kg		~~[illegible]~~		Sn [illegible]	
01092	1100				

40621543 8" depth #4

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04244 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:55 AM

Plant Name ______ Point of Collection 8" below surface of streambed @ north side state highway 36

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1 – 9)	PAGE NO. (10 – 12)	CARD TYPE (13)	DATE Mo. (14 15)	Day (16 17)	Yr. (18 19)	MAT. SAMP (20)
02542	001	B	10	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04244 District 13

Type Sample: Heavy Metals

Grab ✓ Composite ______ Hr.

Observations rain @ time of sample

Lab. Used TRA Lab. No. 84-1641 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	950	01042	275
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	30	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	4190	01147		01077	
Zinc (ug/l) mg/Kg		~~[illegible]~~		Cu total	
01092	152				

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04244 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 11:55 AM

Plant Name Point of Collection 8" below surface of

Method of Flow Measurement n/a streambed @ north side state highway 36

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14–15)	Day (16–17)	Yr. (18–19)	MAT SAMP (20)
02542001	[illegible]	6	10	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM 04244 District 13

Type Sample: Heavy Metals

Lab. Used ETRA Lab. No. 84-1641 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab ✓ Composite Hr.

Type Facility metal plating

Observations rain @ time of sample

Auxiliary Tags none

Date Completed 12-6-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		~~01007~~		01022	
Cadmium (ug/l) mg/Kg		Chromium (ug/l) mg/Kg		Copper (ug/l) mg/Kg	
01027	<0.2	01034	950	01042	275
Lead (ug/l) mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	30	01055		71900	
Nickel (ug/l) mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	4190	01147		01077	
Zinc (ug/l) mg/Kg		~~[illegible]~~		[illegible]	
01092	152				

TEX[illegible]ENT OF WATER RESOURCES

062 / 543

Surface 4B

No. HM04246 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge

Time Collected 2:15 pm

Plant Name

Point of Collection Surface of streambed on south side of state Highway 36

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [signature]

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14 15)	DATE Day (16 17)	DATE Yr. (18 19)	MAT SAMP (20)
02542	001	B	10	09	84	B

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04246

Type Sample: Heavy Metals

District 13

Lab. Used TRA Lab. No. 84-1640 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab ✓ Composite ____ Hr.

Type Facility metal plating

Observations rain prior to sample

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature WMB Cypress

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium ~~(ug/l)~~ mg/Kg		Chromium ~~(ug/l)~~ mg/Kg		Copper ~~(ug/l)~~ mg/Kg	
01027	<0.2	01034	6900	01042	12200
Lead ~~(ug/l)~~ mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
01051	1600	01055		71900	
Nickel ~~(ug/l)~~ mg/Kg		Selenium (ug/l)		Silver (ug/l)	
01067	42200	01147		01077	
Zinc ~~(ug/l)~~ mg/Kg					
01092	7900				

No. SS 03804 OCT 15 1984 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge

Time Collected 1:30 PM

Plant Name

Point of Collection surface of streambed 80 yard downstream of SH # 36

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature Eddie E Olivier

PERMIT NUMBER (1–9)	PAGE NO. (10–12)	CARD TYPE (13)	DATE Mo. (14 15)	Day (16 17)	Yr. (18 19)	MAT. SAMP. (20)
02542	001	B	10	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62

TEXAS DEPARTMENT OF WATER RESOURCES

No. SS 03804 JAN 04 1985 District 13

Type Sample: Special 3E

Grab ✓ Composite ______ Hr.

Observations rain prior to sample

Lab. Used TRA Lab. No. 84-1643 X

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation Ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-16-84

Analyst's Signature Wm Bl[illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
cadmium ~~total~~ Mg/Kg		chromium ~~total~~ Mg/Kg			
01027	2.0	01034	2830		
lead (total) Mg/Kg		copper Mg/Kg			
01051	36.0	01042	1420		
nickel mg/Kg					
01067	6000				
zinc mg/Kg					
01092	102.0				

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04246

District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 2:15 pm

Plant Name ____ Point of Collection Surface of streambed on south side of state Highway 36

Method of Flow Measurement n/a

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
02592	001	B	10	09	84	B

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Flow (gpd)		Water Temperature (°F)		pH	
00056		00011		00400	
D.O. (mg/l)		Turbidity (JTU)			
00300		00070			

TEXAS DEPARTMENT OF WATER RESOURCES

No. HM04246

Type Sample: Heavy Metals

District 13

Lab. Used TRA Lab. No. 84-1640 Hm

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Grab ✓ Composite ____ Hr.

Type Facility metal plating

Observations rain prior to sample

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
Arsenic (ug/l)		Barium (ug/l)		Boron (ug/l)	
01002		01007		01022	
Cadmium ~~(ug/l)~~ mg/Kg		Chromium ~~(ug/l)~~ mg/Kg		Copper ~~(ug/l)~~ mg/Kg	
01027	<0.2	01034	6900	~~01~~042	12200
Lead ~~(ug/l)~~ mg/Kg		Manganese (ug/l)		Mercury (ug/l)	
~~0~~1051	600	01055		71900	
Nickel ~~(ug/l)~~ mg/Kg		Selenium (ug/l)		Silver (ug/l)	
~~0~~1067	42200	01147		01077	
Zinc ~~(ug/l)~~ mg/Kg					
~~01~~092	7900				

No. SS 03806 District 13 County Washington Basin Brazos

Discharger Name Old Brazos Forge Time Collected 1:45PM

Plant Name Point of Collection northeast property line

Method of Flow Measurement n/a surface of streambed

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	Day	Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
0254200	01	3	10	09	84	58

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62

TEXAS DEPARTMENT OF WATER RESOURCES

No. SS 03806 District 13

Type Sample: Special

Grab ✓ Composite Hr.

Observations rain prior to sample

Lab. Used IRA Lab. No. 84-1644 A

Material Sampled: Raw, Partially Treated, Final, Streambed

Method of Preservation ice

Type Facility metal plating

Auxiliary Tags none

Date Completed 12-8-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
cadmium (ug/l) mg/Kg		chromium mg/Kg			
01027	<0.2	01034	2060		
lead mg/Kg		copper mg/Kg			
01051	60	01042	1270		
nickel mg/Kg					
01067	3240				
zinc mg/Kg					
01092	1680				

No. SS 03805

District 13

County Washington Basin Brazos

Discharger Name Old Brazos Forge

Time Collected 1:50 PM

Plant Name

Point of Collection northeast property line

Method of Flow Measurement n/a

8" below surface of stream bed

Chlorine Contact Time n/a

Date Shipped 10-10-84

Collector's Signature [illegible]

PERMIT NUMBER	PAGE NO.	CARD TYPE	DATE Mo.	DATE Day	DATE Yr.	MAT. SAMP.
1 – 9	10 – 12	13	14 15	16 17	18 19	20
02542	001	B	10	09	84	SB

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62

TEXAS DEPARTMENT OF WATER RESOURCES

No. SS 03805 JAN 24 1985

District 13

Type Sample: Special

Lab. Used TRA

Lab. No. 84-1639 X

Material Sampled: Raw, Partially Treated, Final, Streambed

Grab ✓

Composite ______ Hr.

Method of Preservation ice

Type Facility metal plating

Observations rain prior to sample

Auxiliary Tags none

Date Completed 12-16-84

Analyst's Signature [illegible]

21 CODE	26 PARAMETER VALUE	35 CODE	40 PARAMETER VALUE	49 CODE	54 PARAMETER VALUE 62
cadmium	mg/kg	chromium	mg/kg		
01027	1.0	01034	170.0		
lead	mg/kg	copper	mg/kg		
01051	25.0	01042	50.0		
nickel	mg/kg				
01067	250.0				
zinc	mg/kg				
01092	59.0				

Ref. 14

Well Information

TEXAS NATURAL RESOURCES INFORMATION SYSTEM

EMIL BLOMQUIST

TNRIS SYSTEMS CENTRAL

P.O. BOX 13231
AUSTIN, TEXAS 78711-3231

1700 N. CONGRESS AVENUE
512/463-8058

[illegible]

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TDWR ONLY

Organization No. ______ Lab No. 02

Work No. ______

CHEMICAL WATER ANALYSIS REPORT

County 239 WASHINGTON

State Well No. 59-53-201

Well No. ______

Date Collected 07-26-68

Send report to:

Data Collection and Evaluation Section
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711

Location OAK HILL ACRES 4 MI. N OF BRENHAM, TX Sample No. ___ By W. SANDEEN - US

Source (type of well) ______ Owner L.C. OLDHAM

Date Drilled 1964 Depth 1070 ft. WBF —

Producing intervals 470-1060 Water level ______ ft. Sample depth ______ ft.

Sampled after pumping 30 MIN. hrs. Yield 200 GPM meas. est. Temperature ___ °F 29 °C

Point of collection HYDRANT AT WELL Appearance ☒ clear ☐ turbid ☐ colored ☐ other

Use P.S. Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

Constituent	Code	MG/L	ME/L
Silica	00955	48	
Calcium	00915	69	3.44
Magnesium	00925	2	.13
Sodium	00929	49	2.13
Total			.
☐ Potassium	00937	11.	
[3] ☐ Manganese	01055	.	
☐ Boron	01022	.	
[3] ☐ Total Iron	01045	.	
☐ (other) ______			

%Na 36

SAR 1.6

RSC 1.18

Specific Conductance (micromhos/cm[3]) 00095: 562

Diluted Conductance (micromhos/cm[3]) X

" ☐ " items will be analyzed if checked.

Constituent	Code	MG/L	ME/L
Carbonate	00445	0	.00
Bicarbonate	00440	290	4.75
Sulfate	00945	21	.44
Chloride	00940	29	.82
Fluoride	00951	.2	.01
Nitrate	71850	.1	.00
pH	00403	7.5	
Total			6.02

	Code	Value
[1] Dissolved Solids (residue at 180°C)	70300	372
Phenolphthalein Alkalinity as $CaCO_3$	00415	
Total Alkalinity as $CaCO_3$	00410	
Total Hardness as $CaCO_3$	00900	178
[2] Nitrogen Cycle		
Ammonia - N	00610	.
Nitrite - N	00615	.
Nitrate - N	00620	.
Organic Nitrogen	00605	.

Analyst ______ Checked By ______

[1] The bicarbonate reported in this analysis can be converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure used in the computation of dissolved solids.
[2] Nitrogen cycle requires separate sample.
[3] Total Iron and Manganese require separate sample.

TDWR-0148 (Rev. 1-8-80)

WRD Exp. (GW)
April 1966

Well No. YY 59-53-501

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD 1:24,000

Record by W. SANDEEN Source of data D.M WILDER Date 7-29-68 Map BRENHAM 1963

State TEXAS [48] County (or town) WASHINGTON [YY]

Latitude: [3 0 1 0 5 1 N] Longitude: [0 9 6 2 5 0 9] Sequential number: [1]

Lat-long accuracy: [ ] T ___ S, R ___ W, Sec ___

Local well number: [Y Y - 5 9 - 5 3 - 5 0 1] Other number:

Local use: [ ] Owner or name: THE OLD BRAZOS FORGE

Owner or name: [B R A Z O S F O R G E] Address: PO BOX 140 BRENHAM 778

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [N]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [N]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: [N] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: 7-23-68 [0] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 292 ft [292] Meas. rept. DRL accuracy [3]

Depth cased: (first perf.) 264 ft [264] Casing type: STEEL ; Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: NOV 1964 [964] Pump intake setting: 216 ft [216]

Driller: name BRENHAM IRON WORKS address BRENHAM

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 1 [T] Trans. or meter no.

Descrip. MP ___ ft above below LSD, Alt. MP

Alt. LSD: 355 [355] Accuracy: (source) [4]

Water Level RPT 150 ft above below MP; Ft above below LSD [150] Accuracy: [G]

Date meas: 11-64 [N64] Yield: gpm [ ] Method determined [ ]

Drawdown: ft [ ] Accuracy: [ ] Pumping period hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10 [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

5910 52 67 ' 55

Well No. YY 59-53-501

Latitude-longitude 30 10 51 0 96 25 09

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: 03 | Section:

Drainage Basin: 5 2 3 | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — H

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 20 ft 20 Depth to top of: ft 264

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened: 264-284

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

WRD Exp. (CJ)
April 1966

Well No. YY 59-53-503

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

1:24,000

MASTER CARD

Record by W. SANDEEN Source of data D.W. FISCHER Date 10-18-68 Map BRENHAM, 1963

State TEXAS [48] County (or town) WASHINGTON [YY]

Latitude: [301003N] Longitude: [0962621] Sequential number: [1]

Lat-long accuracy: [ ] T ___ S, R ___ W, Sec ___ , ___ ¼, ___ ¼, ___ ¼ B & M

Local well number: [YY-59-53-503] Other number: ~~(LS - R.C. BARNES)~~

Local use: [ ] Owner or name: BRENHAM BOWLING CO

Owner or name: [BRENHAM BOWLING] Address: Box 592 ~~...~~ TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [N]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other SUPPLIES BOWLERAMA & MOTEL [C]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: [N] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [ ]

Freq. sampling: NA [N] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 420 ft [420] Meas. rept. accuracy [6]

Depth cased: (first perf.) ___ ft [ ] Casing type: S ; Diam. 7 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [ ]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: 1959 [959] Pump intake setting: ___ ft [ ]

Driller: POMYKAL DRLG CO. name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep Shallow [ ]

Power (type): diesel, elec, gas, gasoline, hand, gas, wind; natural, LP; H.P. NA [ ] Trans. or meter no.

Descrip. MP ___ ft above below LSD, Alt. MP

UTM

Alt. LSD: 405± [405] Accuracy (method) [4]

Water Level ___ ft above below MP; ft above below LSD [ ] Accuracy: [ ]

Date meas: [ ] Yield: ___ gpm [ ] Method determined [ ]

Drawdown: ___ ft [ ] Accuracy [ ] Pumping period ___ hrs [ ]

QUALITY OF WATER DATA: Iron ___ ppm [ ] Sulfate ___ ppm [ ] Chloride ___ ppm [ ] Hard. ___ ppm [ ]

Sp. Cond. ___ K x 10 [ ] Temp. ___ °F [ ] Date sampled [ ]

Taste, color, etc.

Well No.

Well No. YY 59-53-503

Latitude-longitude 30 10 03 S 96 26 21
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD 1 19

Physiographic Province: 0 3 20 21 Section:

F 22 Drainage basin: 5 2 B 23 25 Subbasin: 26

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat 27

MAJOR AQUIFER: system, series T M 28 29 aquifer, formation, group 30 31

Lithology: 32 33 Origin: 34 Aquifer Thickness: ft

35 37 Length of well open to: ft 38 40 Depth to top of: ft 41 43

MINOR AQUIFER: system, series 44 45 aquifer, formation, group 46 47

Lithology: 48 49 Origin: 50 Aquifer Thickness: ft

51 53 Length of well open to: ft 54 56 Depth to top of: ft 57 59

Intervals Screened:

Depth to consolidated rock: ft 60 63 Source of data: 64

Depth to basement: ft 65 68 Source of data: 69

Surficial material: 70 71 Infiltration characteristics: 72

Coefficient Trans: gpd/ft 73 75 Coefficient Storage: 76 78

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards: 79

WELL LOCATED IN SMALL WOODEN BUILDING BEHIND BOLERAMA.

Well No.

GPO 857-700

#11

WRD Exp. (GW)
April 1966

Well No. YY 59-53-911

WELL SCHEDULE

CHAPPELL HILL STREET

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD

N JERRY ROUSH
HERBERT RUST

1:24,000

Record by W. SANDEEN Source of data C.J. BLUM Date 7-24-68 Map BRENHAM 1963

State TEXAS [4 9] County (or town) WASHINGTON [Y Y]

Latitude: [3 0 0 9 4 9 N] Longitude: [0 9 6 2 3 2 3] Sequential number: [1]

Lat-long accuracy: [2] T. S, R. W, Sec , ¼, ¼, ¼ B & M

Local well number: [Y Y 5 9 - 5 3 - 9 1 1] Other number: #11

Local use: [ ] Owner or name: CITY BRENHAM

Owner or name: [C T Y B R E N H A M # 1 1] Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Ø) Other [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (Ø) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 8-25-52 [Φ] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: 4-29-58 [M]

Freq. sampling: 10-14-59 [Φ] Pumpage inventory: yes no. period: [ ]

Aperture cards: yes [ ]

Log data: [D E]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 593 ft [5 9 3] Meas. Rept. accuracy [3]

Depth cased: (first perf.) 73 ft [7 3] Casing type: S ; Diam. 10-8 in [1 0]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (Ø) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [ ]

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: 1952 [5 2] Pump intake setting: ft [ ]

Driller: TEXAS WATER WELLS name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [T] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. [V] Trans. or meter no.

Descrip. MP ft above below LSD. Alt. MP

Alt. LSD: 280± [2 8 0] Accuracy: (source) [4]

Water level R 65 ft above below MP; Ft above below LSD [6 5] Accuracy: [G]

Date meas. 8-25-52 [5 2] Yield: 375 40 hrs 459 40 hrs gpm [4 5 9] Method determined [4]

Drawdown: 123 ft [1 2 3] Accuracy: [ ] Pumping period 48 hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10⁶ [ ] Temp. 73 °F [2 3] Date sampled [ ]

Taste, color, etc.

Well No.

Well No. YY-59-53-911

Latitude-longitude 30,09,49 96,23,23
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage Basin: 52B Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat S

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 179 ft 179 Depth to top of: ft 73

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened: 73-88; 95-107; 122-142; 185-207; 258-308; 345-355; 465-505; 518-525.

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

UTM WL, 1968; HOLE TOO WET.

WL RPT 65'; 8-25-52

PL 188'; AT END 48' PUMPING TEST

@ RATE OF 375 gpm FIRST

40 HRS; @ 450 gpm LAST

8 HRS.

AFTER TEST

10 MIN. SL 92'

20 " " 78.'

30 " " 74'

Well No.

GPO 857-700

12

WRD Exp. (GW)
April 1966

Well No. YY 59-53-915

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

H. JERRY ROUSH, 1969, WATER SUP.

1:24,000

MASTER CARD

C.J. BLUM

Record by W. SANDEEN Source of data HERBERT RUST Date 7-24-68 Map CHAPPELL HILL, 1963

State TEXAS [4 9] County (or town) WASHINGTON [Y Y]

Latitude: [3 0 0 9 5 5 N] N/S Longitude: [0 9 6 2 3 0 8] Sequential number: [1]

Lat-long accuracy: [2] T. ___ N/S, R. ___ E/W, Sec. ___

Local well number: [Y Y - 5 9 - 5 3 - 9 1 5] Other number: B & M # 12

Local use: [ ]

Owner or name: CITY OF BRENHAM

Owner or name: [C I T Y B R E N H A M] Address: P.O. BOX 361 BRENHAM, TEXAS 778

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 12-30-63 [D] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: 7-24-68 (B) [Ø] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [D]

WELL-DESCRIPTION CARD

TEST HOLE 1002

SAME AS ON MASTER CARD Depth well: 820 ft [8 2 0] Meas. rept DRL accuracy [3]

Depth cased (first perf.) 73 ft [7 3] Casing type: 12 3/4 : 415, 10 3/4 : 820 ; Diam. 10 ~~7~~ 00 in [1 0]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: Nov., 1963 [9 6 3] Pump intake setting: 400 ft [4 0 0]

Driller: TEXAS WATER WELLS (name) HOUSTON (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [T] Deep / Shallow [D]

Power (type): diesel, (elec), nat gas, gasoline, hand, LP gas, wind; H.P. 75 [V] Trans. or meter no.

Descrip. MP ___ ft above/below LSD. Alt. MP

1968 UTM WET HOLE

Alt. LSD: 267 ± [2 6 7] Accuracy: (source) [4]

Water level R 42 ft above/below MP; ft above/below LSD [4 2] Accuracy: [D]

Date meas. 12-30-63 [D 6 3] Yield: ___ gpm [ ] Method determined [ ]

Drawdown: ___ ft [ ] Accuracy: [ ] Pumping period ___ hrs [ ]

QUALITY OF WATER DATA: Iron ___ ppm [ ] Sulfate ___ ppm [ ] Chloride ___ ppm [ ] Hard. ___ ppm [ ]

Sp. Conduct ___ K x 10^6 [ ] Temp. ___ °F [ ] Date sampled [ ]

Taste, color, etc.

Well No. 7Y-59-53-915

Latitude-longitude 30 09 55 96 23 08
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: 03 | Section:

F | Drainage Basin: 528 | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat — S

MAJOR AQUIFER: system, series — TM — CATAHOULA ? — aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: 208 ft 208 Depth to top of: 75 ft 75

MINOR AQUIFER: system, series, aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: (11) (23) ft (64) Depth to top of: (50) (60) ft

Intervals Screened: 75-86; 120-143, 350-414; 463-518; 750-810

11
23
64
50
60
208

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

LOCATED AT NORTH END OF OLD AIRPORT ON S SIDE OF DRAW AND SOUTH OF SOUTHERN PACIFIC RR TRACKS.

UTM WATER LEVEL IN 1968 DUE TO "WET HOLE".

Well No.

GPO 857-700

#13

WRD Exp. (GW)
April 1966

Well No. YY-59-53-916

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

H. JERRY ROUCH, 1969 CALL: 713 836-9911
HERBERT RUST 1:24,000

MASTER CARD

Record by W. SANDEEN | Source of data C-J BLUM | Date 7-24-68 | Map BRENHAM; 1963

State TEXAS [4|9] County (or town) WASHINGTON [Y|Y]

Latitude: [3|0|0|9|3|7|N] Longitude: [0|9|6|2|2|2|5] Sequential number: [1]

Lat-long accuracy: [2] T. N S, R. E W, Sec.

Local well number: [YY-59-53-916] Other number: B&M #13

Local use: [ ] Owner or name: CITY OF BRENHAM

Owner or name: [CITY BRENHAM 13] Address: BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [P]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: APRIL, 1968 [Φ] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [C]

Freq. sampling: 7-24-68 [Φ] Pumpage inventory: yes no. period: [ ]

Aperture cards: yes [ ]

Log data: DRL'S & E LOGS [D|E]

WELL-DESCRIPTION CARD

TEST HOLE 1523

SAME AS ON MASTER CARD | Depth well: 1,000 ft [1|0|0|0] Meas. rept. DRL accuracy [3]

Depth cased: (first perf.) 120 ft [1|2|0] Casing type: STEEL; Diam. 10 3/4 in [1|0]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [G]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (R) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: MARCH 1963 [3|6|3] Pump intake setting: 410 ft [ ]

Driller: TEXAS WATER WELLS (name, address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [T] PEERLESS Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 100 [V] Trans. or meter no.

Descrip. MP ft above below LSD. Alt. MP

Alt. LSD: 315± [3|1|5] Accuracy: (source) [4]

Water Level APT 200 ft above below MP; Ft above below LSD [2|0|0] Accuracy: [G]

Date meas. APRIL, 1968 [4|6|8] Yield: 525 MEASURED gpm [5|2|5] Method determined [ ]

Drawdown: APT. 158 ft [1|5|8] Accuracy: [ ] Pumping period 100 MIN hrs [2]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduc: K x 10^6 [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

WRD Exp. (GW)
April 1966

Well No. YY 59-53-903

TBWE, 1943; #129

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD W. SANDEEN 1:24,000

Record by (C. R. FOLLETT) 6-23-42 Source of data LOUIS BEAZLEY Date 8-4-68 Map BRENHAM, 1963

State TEXAS [49] County (or town) WASHINGTON [YY]

Latitude: [30 09 32 N] Longitude: [096 23 50] Sequential number: [3]

Lat-long accuracy: [2] T____ S. R____ Sec____

Local well number: [YY-59-53-903] Other number: #3

Local use: [ ] Owner or name: CITY OF BRENHAM

Owner or name: [CITY BRENHAM #3] Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [U]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [U]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 11-20-42 [I] Field aquifer char. [ ]

Hyd. lab. data: [ ]

Qual. water data; type: [ ]

Freq. sampling: [N] Pumpage inventory: yes no, period: [ ]

Aperture cards: yes [ ]

Log data: [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 182 ft [182] Meas. Rept. accuracy [6]

Depth cased: (first perf.) — ft [ ] Casing type: STEEL; Diam. 8 in [8]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [ ]

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: 1913 [913] Pump intake setting: ft [ ]

Driller: G. C. BOOTH name, address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [N] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. WAS AIR LIFT [ ] Trans. or meter no.

Descrip. MP ft above below LSD, Alt. MP

Alt. LSD: 310 ± [310] Accuracy: (source) [4]

Water Level 60.80 ft above below MP, ft above below LSD [61] Accuracy: [A]

Date meas. 11-20-42 [1142] Yield: gpm [ ] Method determined [ ]

Drawdown: ft [ ] Accuracy: [ ] Pumping period hrs [ ]

QUALITY OF WATER DATA: Iron ppm [ ] Sulfate ppm [ ] Chloride ppm [ ] Hard. ppm [ ]

Sp. Conduct K x 10[6] [ ] Temp. °F [ ] Date sampled [ ]

Taste, color, etc.

W-S

60.80

Well No.

Well No. YY-59-53-903

Latitude-longitude 30 09 32 s 96 23 50
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: [0|3] | Section:

[F] Drainage Basin: [5|2|B] Subbasin: [ ]

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat [C]

MAJOR AQUIFER: system, series [T|M] aquifer, formation, group [J|]

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: NA ft; Depth to top of: NA ft

MINOR AQUIFER: system, series; aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft; Depth to top of: ft

Intervals Screened: NA

Depth to consolidated rock: ft; Source of data:

Depth to basement: ft; Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft; Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

9-194
May 19[illegible]

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES BRANCH

YY-595 3903

WATER LEVEL MEASUREMENTS (Field) Measured by H 12[illegible]

Location of Project [illegible]

DATE	HOUR	WELL NO.	TAPE READING AT— Meas. point	TAPE READING AT— Water level	DEPTH TO WATER	REMARKS
	+2 1/0					
1[illegible]	[illegible]	3	72	.87	72.13	.37
	1:25		72	.50	71.50	.22
	[illegible]:57		72	.28	71.72	.34
	[illegible]:15		73	2.[illegible]	7[illegible]	.08
	[illegible]:45		73	0.86	72.14	.16
	6:17		73	0.70	72.30	.09
	7:26		73	0.61	[illegible]	.11
	[illegible]:13		73	[illegible]	72.50	
	10:55		70	6.98	63.02	
20	[illegible]		[illegible]	1.[illegible]7	[illegible]	1.49
	[illegible]		6[illegible]	[illegible]7	61.03	.50
	7:41		[illegible]	1.11	[illegible]	.14
	8:29		61	0.20	60.80	.09
	[illegible]:58		73	3.32	69.68	8.88
	11:40		73	203	70.97	.37
	1:06		73	1.62	71.34	.33
	2:45		73	1.33	71.67	.27
	4:15		72	0.06	71.94	.16
	5:15		73	0.90	72.10	
	6:41		73	0.75	72.25	

9—6673

WRD Exp. (GW)
April 1966

Well No. YY 59-53-904

TBWE, 1943; #130

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD W. SANDEEN 1:24,000

Record by (C.R. FOLLETT) 6-23-42 Source of data LOUIS BEASLEY Date 8-4-68 Map BRENHAM, 1963

State TEXAS 49 County (or town) WASHINGTON YY

was

Latitude: 300932 N Longitude: 0962350 Sequential number: 4

Lat-long accuracy: 2 T. S, R. W, Sec.

Local well number: YY-59-53-904 Other number: B & M #4

Local use: Owner or name: CITY BRENHAM

Owner or name: CITY BRENHAM #4 Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — M

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — REPORTED DESTROYED, 1966 — U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — Z

DATA AVAILABLE: Well data Freq. W/L meas.: 6-23-42 Φ Field aquifer char.

Hyd. lab. data:

Qual. water data; type:

Freq. sampling: N Pumpage inventory: yes no. period:

Aperture cards: yes

Log data:

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 96 ft 96 Meas. rep. accuracy 6

Depth cased: (first perf.) ft Casing type: S ; Diam. 12 in 12

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: 1913 913 Pump intake setting: ft

Driller: G. C. BOOTH name address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — N Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. Trans. or meter no.

Descrip. MP LOWER EDGE 3/4" INCH HOLE 24 ft above below LSD, Alt. MP

Alt. LSD: 310± 310 Accuracy: (source) 4

Water Level 13.08 ft above below LSD 11 Accuracy: A

13.08
3.4
To .68

Date meas: 6-23-42 642 Yield: gpm Method determined

Drawdown: ft Accuracy: Pumping period hrs

QUALITY OF WATER DATA: Iron ppm Sulfate ppm Chloride ppm Hard. ppm

Sp. Conduct K x 10^6 Temp. °F Date sampled

Taste, color, etc.

Well No.

Well No. XY-59-53-904

Latitude-longitude 30 09 32.0 96 23 50
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage basin: 528 Subbasin:

Topo of well site:
(D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp,
(O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

WRD Exp. (GW)
April 1966

Well No. YY 59-53-909

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD W. SANDEEN — H. DERRY-ROUSH, HERBERT RUST — 1:24,000

Record by C.R FOLLETT (9-30-59) Source of data MCEEROFF Date 8-4-68 Map BRENHAM, 1963

State TEXAS [48] County (or town) WASHINGTON [YY]

Latitude: 300926N Longitude: 0962400 Sequential number: 1

Lat-long accuracy: 2 T____ S, R____ , Sec____

Local well number: YY-59-53-909 Other number: # 9 B&M

Local use:

Owner or name: CITY OF BRENHAM

Owner or name: CTY BRENHAM #9 Address:

Ownership: County, Fed Gov't, City, Corp or Co, Private, State Agency, Water Dist — M

Use of water: Air cond, Bottling, Comm, Dewater, Power, Fire, Dom, Irr, Med, Ind, P S, Rec, Stock, Instit, Unused, Repressure, Recharge, Desal-P S, Desal-other, Other — P

Use of well: Anode, Drain, Seismic, Heat Res, Obs, Oil-gas, Recharge, Test, Unused, Withdraw, Waste, Destroyed — W

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 7-24-63 [Φ] Field aquifer char. [ ]

Hyd. lab. data:

~~PROBABLY FROM SHALLOW SNDS~~

Qual. water data: type: WATER HAS 7. ppm NO_3, '58 ANALYSIS [M]

Freq. sampling: 7-24-63, 4-25-58, 10-14-59 [Φ] Pumpage inventory: yes no. period:

Aperture cards: yes

Log data: DRL'S LOG [DE]

WELL-DESCRIPTION CARD

TEST HOLE ...

SAME AS ON MASTER CARD — Depth well: ? 511 ft [511] Meas. rept — accuracy [6]

Depth cased: (first perf.) 98 ft [98] Casing type: S; Diam. 5 in [5]

Finish: porous concrete, gravel w. (perf.), gravel w. (screen), horiz. gallery, open end, perf., screen, sd. pt., shored, open hole, other — S

Method Drilled: air rot, bored, cable, dug, hyd, jetted, air percussion, reverse rotary, trenching, driven, drive wash, other — H

Date Drilled: 1948 [948] Pump intake setting: 240 ft [240]

Driller: LAYNE TEXAS (name), HOUSTON (address)

Lift (type): air, bucket, cent, jet, multiple (cent.), multiple (turb.), none, piston, rot, submerg, turb, other — T — Deep / Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 40 [V] Trans. or meter no.

Descrip. MP 2.0 ft above below LSD Alt. MP

Alt. LSD: 310± [310] Accuracy (to ft.) [4]

Water Level: 84.26 ft above below MP — ft above below LSD [82] Accuracy: [A]

Date meas: 7-24-63 [763] Yield: R 460 (1959) [460] Method determined [4]

Drawdown: 144 ft [144] Accuracy: [ ] Pumping period 24 hrs [24]

QUALITY OF WATER DATA: Iron ppm; Sulfate ppm; Chloride ppm; Hard. ppm

Sp. Conduct K x 10^6 [ ] Temp. 72 [72] Date sampled

Taste, color, etc.

84.26
2.0
82.26

Well No. YX-59-53-909

Latitude-longitude 30 09 26 96 24 00
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: | 03 | Section:

F | Drainage Basin: | 528 | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat | C

MAJOR AQUIFER: system, series | TM | aquifer, formation, group | J

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: 114 ft | 114 | Depth to top of: ft | 98

MINOR AQUIFER: system, series | aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ~~10~~ 23 ft | Depth to top of: ~~30~~ 27 ft (10)

Intervals Screened: 98-121, 128.6-139.6, 168.6-189.6, 370.5-400.9, 423.6-433.6, 478.9-511 (32)

Depth to consolidated rock: ft | Source of data:

Depth to basement: ft | Source of data:

Surficial material: | Infiltration characteristics:

Coefficient Trans: gpd/ft | Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

23
10
21
30
32.6
114.

RPT ... 2-11-69 (2 MONTHS)

WL 70.10 - MP 2.0 2-11-69
(MEASURED WHILE PUMP WAS DOWN; ... COLLAR ... 2.0' ...)

Well No.

GPO 857-700

~~8~~ 7

WW

UNITED STATES
[DEPART]MENT OF THE INTERIOR
[G]EOLOGICAL SURVEY
[WAT]ER RESOURCES BRANCH

9-30, 1959 Field No.

Record by C.S.T. Office No.

Source of data Mgr. [illegible] YY-59-53909

1. *Location:* State Tex County Wash

Map

¼ ¼ sec. T. N/S R. E/W

2. *Owner:* City of Brenham well 9 Address

9 Tenant Address

Driller The Layne-Texas Co. Address

3. *Topography*

4. *Elevation* 350 ft. above/below

5. *Type:* Dug, drilled, driven, bored, jetted 4-1948

6. *Depth:* Rept. 1096 ft. Meas. ft.

7. *Casing:* Diam. 10¾ in., to 8 in., Type S

Depth 511 ft., Finish screen

98	121'
128'6"	138'6"
168'6"	189'6"
370'5"	400'8"
423'9"	433'6"
478'9"	500'5"

8. *Chief Aquifer* Oakville [illegible] Form From ft. to ft.

Others

9. *Water level* 68 ft. rept./meas. 1-22-1949 above/below

which is ft. above/below surface

10. *Pump:* Type L-T Capacity 6" G. M.

Power: Kind E Horsepower 40

11. *Yield:* Flow G. M., Pump 460 G. M., Meas., Rep., Est.

Drawdown ft. after hours pumping G. M.

12. *Use:* Dom., Stock, PS, RR., Ind., Irr., Obs.

Adequacy, permanence

13. *Quality* Temp 72½ °F.

Taste, odor, color Sample No 10-14-59

Unfit for

14. *Remarks:* (Log, Analyses, etc.) Elec log in USGS files

59-53-909

Log

4	4	Surface soil
18	22	Sand
5	27	Clay
5	32	Sand
20	52	Sand
38	90	Sandy white clay
52	142	Sand and breaks of sandy clay
43	185	Clay
3	188	clay
12	200	Clay - sand broken
33	233	Clay
21	254	Sandy clay and streaks of sand
26	280	Clay
28	308	Sandy clay
29	337	Clay
3	340	Rock
43	383	Shale and boulders
22	405	Hard shale, boulders and streaks of lime
33	438	Sand and sandy shale
50	488	gray and yellow shale
14	502	Sand
50	552	Shale
21	573	Sand
16	589	Shale
5	594	Sand

cont next page

59-53-909

Well 9 Cont

11	605	shale
6	611	sand
3	614	shale
7	621	sand and shale
36	657	shale and sand streaks
14	671	shale
17	688	sand and shale (broken)
16	704	shale
10	714	sandy shale
21	735	shale
16	751	sandy shale
63	814	sandy shale, streaks of sand and shale
136	950	shale
21	971	sandy shale
40	1011	shale & boulders
14	1025	sandy shale
71	1096	shale.

marked water at and sampled

100-120 424-434
130-140 480-500
371-401

59-53-909

Brenham well 9
Casing and screen
18" to 90'
10¾" from 0 to 249
8" from 251 to 511'5" (swedged nipple 249-251)

Screens at 98' to 121'
128'6" to 138'6"
168'6" to 189'6"
370'5" to 400'8"
423'9' to 433'6"
478'9" to 500'5"

Bottom of set nipple 511'5"
gravel wall well - 30" underreamed
Inactive static 68' 1-22-49
10' static 100' after 24 hrs pumping @ 503 gpm

Pumping level 212'
Spec. Cap. ~~3.35~~ 65 144

Pump set at 240' - 6" column
40 HP. E motor
Well is 1200' from water works

59-53-909

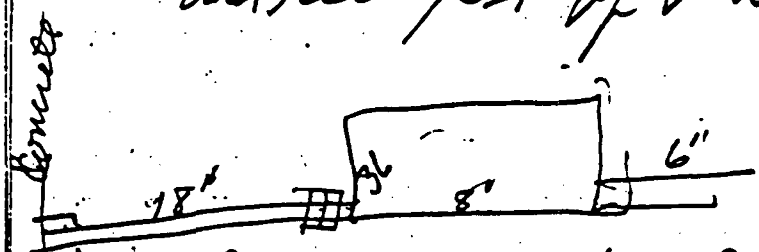
Anal by State Health Dept.
4-25-58 Raw water

Ca	151	CO_3	0
Mg	6	HCO_3	399
Fe	.02	SO_4	8
Mn	<.05	Cl	86
Na	23	F	0.2
		NO_3	7

Spec. Cond. 862
Total Solids 517
Hardness 425
pH 6.8

KEY PUNCHED

air relief 2 of WW



should be good yield

WRD Exp. (GW)
August 1966

Spring No. YY-59-53-912

TBWE, 1943, #133

SPRING SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

CARD D

W. SANDEEN

Record by: (C.R. FOLLETT 6-23-42) Source of data: MR BRADLEY Date: 11-14-68

State: TEXAS [49] County: WASHINGTON [YY] Map name and scale: BRENHAM 1:24,000

Latitude: [300932N] Longitude: [0962350] Sequential number: [9]

Lat-long accuracy: [2] T___ N S, R___ E W, Sec___, ___¼, ___¼, ___¼, ___ B&M

Local spring number: [YY-59-53-9 2] Other number:

Local use: [ ] Owner or name: [CITY BRENHAM]

Owner or name: CITY BRENHAM Address:

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [M]

Use of water: (A) Air cond, (B) Bottl, (C) Comm, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused SUPPLEMENTARY [P]

Altitude: 305 [305] Accuracy: [4] Disch. meas: 12 GPM [12]

Unit of meas: 1 cfs 2 gpm [2] How determined: Bucket, meter, weir, est. [1] Date of meas: 1-2-69 (IN RAIN) [1969]

Magnitude: 1 >100 cfs, 2 >10-100, 3 >1-10, 4 101 gpm-1 cfs, 5 11-100 gpm, 6 1-10, 7 1/8 gpm-1 gpm, 8 <1/8 gpm [2]

Impelling force: 1 Artesian, 2 gravity, 3 thermal [2] Permanence: [1] Card desig. [D]

CARD E

12 GPM 1-2-69

SAME AS CARD D Variability: [ ] Phys. Province: [03]

Phys. section: [F] Drainage basin: [528] Sub-basin: [ ]

Topo: (C) str. chan, (D) loc dep, (F) flat sur, (H) hilltop, (S) hillside, (T) terr, (U) undul, (V) val flat, (O) offshore [C]

Aquifer: system, series [TM] aquifer, formation, group [ ]

Lithology: S [ ] Origin: [ ]

Rock structure: Bedding: [ ] str. dip Joints: Major [ ] str. dip Minor [ ] str. dip

Fault: GRAVITY [ ] str. dip Type of spring: [ ] Number of open: [ ]

Size of openings: [ ] width [ ] height Sphere of discharge: [ ] Improvements: [illegible] [ ]

Gases: Yes No [ ] Minerals: [ ] Biological: Flora: [ ]

Fauna: [ ] Quality of water data: Type: [illegible] (6-23-42) [ ]

Iron: ___ ppm [ ] Sulfate: ___ ppm [ ] Chloride: ___ ppm [ ] Hardness: ___ ppm [ ]

342

Sp. Cond: K x 10^6 [ ] Temp: 69 °F [21] Date sampled: [ ]

Freq: QW [ ] Freq: Disch. [ ] Card desig. [E]

Remarks: [illegible] S [illegible]

BRICK WALLED PIT 25 DEEP, 40'X75' WIDE

Supplementary Supply

"Apparently fault goes through pit dug to catch water!"

[illegible]

TEMP 65° ON 2-11-69

PESTICIDE SAMPLE TAKEN TWICE:
1-2-69; IN RAIN, SILVEX POSITIVE.
2-11-69; ALL PESTICIDES, NEGATIVE

59-53-912

apparently a fault goes thru the pit dug to catch water as Mr Beazley says the sandstone ~~outcrop~~ layers did not match.

WRD Exp. (GW)
April 1956

Well No. 59-53-802

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY 336 37 — WATER RESOURCES DIVISION

1:24,000

MASTER CARD

Record by W. SANDEEN Source of data OWNER Date 8-15-68 Map BRENHAM, 1963

State TEXAS [49] County (or town) WASHINGTON [YY]

Latitude: [30 09 45 N] Longitude: [096 27 04] Sequential number: [1]

Lat-long accuracy: [1] T ___ S. R ___ W. Sec ___

Local well number: [YY-59-53-802] Other number: ___

Local use: [ ] Owner or name: V.S. RMS WHITMARSH

Owner or name: [V. WHITMARSH] Address: CITY CARD ... 2 BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist [P]

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other [H]

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. [W]

DATA AVAILABLE: Well data [ ] Freq. W/L meas.: 10-17-68 [O] Field aquifer char. [ ]

Hyd. lab. data: ___ [ ]

Qual. water data; type: ___ [A]

Freq. sampling: 10-17-68 [O] Pumpage inventory: yes no. period: ___ [ ]

Aperture cards: ___ yes [ ]

Log data: ___ [ ]

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 457 ft [457] Meas. rept. accuracy [3]

Depth cased: (first perf.) N.A. ft [ ] Casing type: STEEL ; Diam. 4 in [4]

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other [S]

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other [H]

Date Drilled: Aug 1965 [9 6 5] Pump intake setting: 189 ft [189]

Driller: T & S DRILLING Co.

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other [S] Deep Shallow [ ]

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 1 [T] Trans. or meter no. ___

Descrip. MP TOP CASING +1.2 ft above below LSD, Alt. MP ___

Alt. LSD: 405± [405] Accuracy (source) [4]

Water level: 128.34 ft above below MP ft above below LSD [127] Accuracy: [A]

Date meas: 10-17-68 [068] Yield: ___ gpm [ ] Method determined [ ]

Drawdown: ___ ft [ ] Accuracy: [ ] Pumping period ___ hrs [ ]

QUALITY OF WATER DATA: Iron ___ ppm [ ] Sulfate ___ ppm [ ] Chloride ___ ppm [ ] Hard. ___ ppm [ ]

Sp. Conduct ___ K x 10 [ ] Temp. ___ °F [ ] Date sampled ___ [ ]

Taste, color, etc. ___

140

128.34
1.2
127.14

Well No.

Well No. YY - 9-53-802

Latitude-longitude 30 09 49 96 27 04

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

Drainage Basin: F 52B Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat S

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

Well No.

GPO 857-700

Typewrite (Black ribbon) or Print Plainly
(soft pencil or black ink)
Do not use ball point pen

Texas Department of Health Laboratories
1100 West 49th Street
Austin, Texas 78756

TDWR ONLY

Organization No. ______ Lab No. 02

Work No. ______

CHEMICAL WATER ANALYSIS REPORT

County 239 WASHINGTON

State Well No. 59-53-802

Well No. ______

Date Collected 10-17-68

Send report to:

Data Collection and Evaluation Section
Texas Department of Water Resources
P.O. Box 13087
Austin, Texas 78711

Location 2 MI W OF BRENHAM, TEXAS Sample No. ______ By W. SANDEEN - USG

Source (type of well) ______ Owner VERNON WHITMARSH

Date Drilled 1965 Depth 457 ft. WBF —

Producing intervals — Water level — ft. Sample depth ______ ft.

Sampled after pumping 30 MIN Yield 9 GPM meas./est. Temperature ______ °F ______ °C

Point of collection HOSE FROM HYDRANT IN YARD Appearance ☒ clear ☐ turbid ☐ colored ☐ other

Use DOM. Remarks ______

(FOR LABORATORY USE ONLY)

CHEMICAL ANALYSIS

KEY PUNCHED

Laboratory No. ______ Date Received ______ Date Reported ______

Constituent	Code	MG/L	ME/L
Silica	00955		
Calcium	00915		
Magnesium	00925		
Sodium	00929		
Total			
☐ Potassium	00937		
[3] ☐ Manganese	01055		
☐ Boron	01022		
[3] ☐ Total Iron	01045		
☐ (other) ______			

%Na ______

SAR ______

RSC 2.5

Specific Conductance (micromhos/cm³) 00095 616

Diluted Conductance (micromhos/cm³) X

"☐" items will be analyzed if checked.

Constituent	Code	MG/L	ME/L
Carbonate	00445	0	.00
Bicarbonate	00440	347	
Sulfate	00945	14	.29
Chloride	00940	22	
Fluoride	00951		
Nitrate	71850		
pH	00403		
Total			

Determination	Code	Value
[1] Dissolved Solids (residue at 180°C)	70300	
Phenolphthalein Alkalinity as $CaCO_3$	00415	
Total Alkalinity as $CaCO_3$	00410	
Total Hardness as $CaCO_3$	00900	272
[2] Nitrogen Cycle		
Ammonia - N	00610	
Nitrite - N	00615	
Nitrate - N	00620	
Organic Nitrogen	00605	

[1] The bicarbonate reported in this analysis can be converted by computation (multiplying by 0.4917) to an equivalent amount of carbonate, and the carbonate figure used in the computation of dissolved solids.
[2] Nitrogen cycle requires separate sample.
[3] Total Iron and Manganese require separate sample.

Analyst ______ Checked By ______

TDWR-0148 (Rev. 1-8-80)

Brenham, Texas

State: Texas 4 9 | County: Washington | Y Y Well No. | Latitude 3 0 0 9 4 9 N | Longitude 0 9 6 2 7 0 4 | Seq. No. 1 | Date M D Y 1 0 1 7 6 8 | Sampling Depth | Type H

Local Well No. YY-59-53-802 Location 2 mi. west of Brenham, Texas

Owner: Vernon Whitmarsh Date drilled: 1965 Depth: 457' WBF Prod. intervals **KEY PUNCHED** Static 128.34' blw. L.S.D. 1.2' abv. LSD Water level 405'

Sample taken after pumping 30 min. Yield 9 GPM Pt. of coll. Hose from hydrant in yard Appearance Clear Use Dom. Collector W. Sandeen

K x 10^6 ; K KCl 204 ; K sample 331 ; 616	HCO₃ 50 ml ; 17.35 ; Total Alk as CO₃ ; mg/l 347	B ; A ___ mg ; ___ mg ; ___ mg ; ___ ml
pH 6.9 ; Temperature °C	CO₃ 50 ml ; 0 ; .00	Al ; Fe ; Mn .00 ; .00
Density at 20°C ; mg/l ; me/l	SO₄ 10 ml ; Blk ; Std ; Sample .70 ; 14	Cu ; Pb ; Zn
SiO₂ ___ ml ; A sample	Cl 50 MM ml ; 2.18 ; 22	Dissolved solids: Determined ; Calculated
Al ___ ml ; A 0.00250 mg ; .00625 mg ; .0125 mg ; .025 mg ; Sample ; ___ mg/l	Source ; Card No. 0	Hardness 25 ml ; 6.80 me/l Ca + Mg ; me/l Alk ; me/l NCH ; Ca+Mg 272 ; NCH 0
Fe A 0.025 mg ; ml Sample Total ___ mg/l ; ml Sample Diss. ___ mg/l	F ___ ml ; A 1.00 mg/l ; 2.00 mg/l ; A sample	Color ; Card No.
Mn ; Total .00 mg/l	NO₃ ___ ml std. ___ ml ; A sample ; A ___ ml std ; A ___ ml std ___ Factor	Br ; I
Dissolved ___ mg/l		Alk. as $CaCO_3$; Free CO_2
Ca ___ ml	NO₂ ___ ml ___ mg/l ; A 0.01 mg ; .02 mg ; .05 mg ; Sample	Percent Na ; SAR ; RSC 23
Mg	PO₄ ___ ml Ortho ___ Total ; A 0.0050 mg ; .0100 mg ; .0250 mg ; .0500 mg ; Sample	MBAS ; NO₂ ; Card No. S
Na	Total anions	Analyst LUPE NAMOS Checked by LR + MLH ; Date begun OCT 3 1 1968 Completed NOV 5 1968
Na + K Calc.	Milliequivalents per liter ; Na+K — Cl ; Ca — $HCO_3 + CO_3$; Mg — SO_4	Transmittals ; Date ; Records processing ; Collector X ; Owner
K		
Percent error ; Total anions		Received by

WRD Exp. (CV)
April 1966

Well No. YY 59-53-907

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

TBWE 1943; #134
1: 24,000

MASTER CARD W. SANDEEN

Record by (C. R. FOLLETT (6-23-42)) Source of data MR. BEAZLEY Date 8-4-68 Map BRENHAM, 1963

State TEXAS 48 County (or town) WASHINGTON YY

Latitude: 30 09 32 N Longitude: 096 23 50 Sequential number: 7

wms

Lat-long accuracy: 2 T. ___ S, R ___ Sec ___

Local well number: YY-59-53-907 Other number: #7

Local use: ___ Owner or name: CITY BRENHAM

Owner or name: CITY BRENHAM 7 Address: P.O. BOX 361 BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — M

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. — U

DATA AVAILABLE: Well data ___ Freq. W/L meas.: ___ I Field aquifer char. ___

Hyd. lab. data: ___

Qual. water data; type: ___ C

Freq. sampling: 6-23-42 O Pumpage inventory: yes no, period: ___

Aperture cards: ___ yes

Log data: ___

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 198 ft 153 Meas. rept. accuracy 6

Depth cased: (first perf.) ___ ft ___ Casing type: S ; Diam. 10 in 10

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — P

Method Drilled: (A) air rot., (B) bored, (C) cable, (D) dug, (H) hyd rot., (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: 1934 934 Pump intake setting: ___ ft

Driller: J. W. JACKSON (name) (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — N Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. ___ Trans. or meter no. ___

Descrip. MP +2.2 ft above below LSD, Alt. MP ___

Alt. LSD: 310I 310 Accuracy: (source) 4

Water Level 69.35 ft above below LSD 67 Accuracy: TAPE A

69.35
2.2
67.15

Date meas: 5-26-61 561 Yield: AV 153 gpm 153 Method determined ___

Drawdown: ___ ft ___ Accuracy: ___ Pumping period ___ hrs

QUALITY OF WATER DATA: Iron ___ ppm Sulfate ___ ppm Chloride ___ ppm Hard. ___ ppm

Sp. Conduct ___ K x 10 ___ Temp. 71½ °F 72 Date sampled ___

Taste, color, etc. ___

Well No. XY-59-53-907

Latitude-longitude 30 09 32.0 96 23 50
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD | Physiographic Province: | 03 | Section:

F | Drainage Basin: | 528 | Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat | C

MAJOR AQUIFER: system, series | TM | aquifer, formation, group | J

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

MINOR AQUIFER: system, series | aquifer, formation, group

Lithology: | Origin: | Aquifer Thickness: ft

Length of well open to: ft | Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft | Source of data:

Depth to basement: ft | Source of data:

Surficial material: | Infiltration characteristics:

Coefficient Trans: gpd/ft | Coefficient Storage:

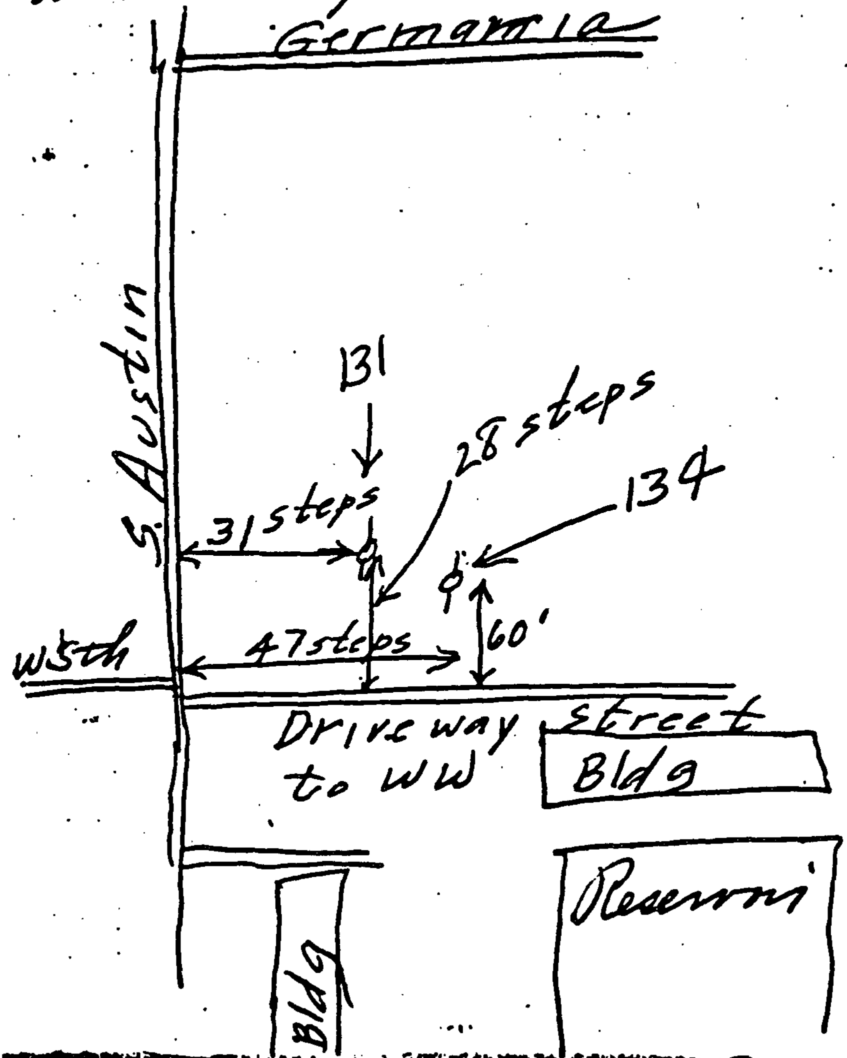
Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

WELL NUMBER SCRATCHED IN MORTAR

Well No.

GPO 857-700

City has well #7 painted over door. Well in stucco building, door on S side. well is N of WW bldgs. and SE of well 131.



WRD Exp. (GW)
April 1966

Well No. #YY-59-53-908

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

MASTER CARD W. SANDEEN HERBERT RUST H. JERRY ROUSH 1:24,000

Record by (C. R FOLLETT) (9-30-59) Source of data MGEBROFF Date 3-4-68 Map BRENHAM 1963

State TEXAS 48 County (or town) WASHINGTON YY

WMS Latitude: 300932 N Longitude: 0962350 Sequential number: 8

Lat-long accuracy: 2 T ___ S. R ___ W. Sec ___

Local well number: YY-59-53-908 Other number: #8 B & M

Local use: ___ Owner or name: CITY BRENHAM

Owner or name: CTY BRENHAM 8 Address: BOX 361 BRENHAM, TEX 77

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist — M

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — U

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed. — U

DATA AVAILABLE: Well data ___ Freq. W/L meas.: ___ N Field aquifer char. ___

Hyd. lab. data: ___

Qual. water data; type: (STATE HEALTH LAB) — C

Freq. sampling: 1-15-57 Φ Pumpage inventory: yes no; period: ___

Aperture cards: ___ yes

Log data: ___

WELL-DESCRIPTION CARD

SAME AS ON MASTER CARD Depth well: 200± ft 200 Meas. Rept accuracy 6

Depth cased: (first perf.) ___ ft Casing type: S ; Diam. 6 in 6

(NA) Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (H) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other

Date Drilled: 1944 944 Pump intake setting: ___ ft

Driller: ___ name, ___ address

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — N Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. ___ Trans. or meter no. ___

Descrip. MP ___ ft above below LSD, Alt. MP ___

Alt. LSD: 310± 310 Accuracy: (source) 4

Water Level N.A. ft above below MP; ft above below LSD ___ Accuracy: ___

Date meas: ___ Yield: RPT 170 (9-30-59) gpm ___ Method determined ___

Drawdown: ___ ft Accuracy: ___ Pumping period ___ hrs

QUALITY OF WATER DATA: Iron ___ ppm Sulfate ___ ppm Chloride ___ ppm Hard. ___ ppm

Sp. Conduct ___ K x 10 ___ Temp. ___ °F Date sampled ___

Taste, color, etc. ___

Well No.

Well No. YY-59-53-908

Latitude-longitude 30 09 32 096 23 50
d m s d m s

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD

Physiographic Province: 03 Section:

F Drainage Basin: 52B Subbasin:

Topo of well site: (D) depression, (C) stream channel, (E) dunes, (F) flat, (H) hilltop, (K) sink, (L) swamp, (O) offshore, (P) pediment, (S) hillside, (T) terrace, (U) undulating, (V) valley flat C

MAJOR AQUIFER: system, series TM aquifer, formation, group J

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

MINOR AQUIFER: system, series aquifer, formation, group

Lithology: Origin: Aquifer Thickness: ft

Length of well open to: ft Depth to top of: ft

Intervals Screened:

Depth to consolidated rock: ft Source of data:

Depth to basement: ft Source of data:

Surficial material: Infiltration characteristics:

Coefficient Trans: gpd/ft Coefficient Storage:

Coefficient Perm: gpd/ft^2; Spec cap: gpm/ft; Number of geologic cards:

NOT WELL N 8 OF 1942

Well No.

GPO 857-700

WRD Exp. (GW)
April 1966

Well no. YY-59-53-916

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR — GEOLOGICAL SURVEY — WATER RESOURCES DIVISION

H. JERRY ROUSH, 1969 CALL: 713 836-5911
HERBERT RUST 1:24,000

MASTER CARD

Record by W. SANDEE Source of data C.J BLUM Date 7-24-68 Map BRENHAM; 1963

State TEXAS | 49 | County (or town) WASHINGTON | YY

Latitude: 300937 N Longitude: 0962225 Sequential number: 1

Lat-long accuracy: 2 T. ___ S, R ___ W, Sec ___

Local well number: YY-59-53-916 Other number: B & M #13

Local use: ___ Owner or name: CITY OF BRENHAM

Owner or name: CITY BRENHAM 13 Address: BRENHAM, TEXAS

Ownership: (C) County, (F) Fed Gov't, (M) City, (N) Corp or Co, (P) Private, (S) State Agency, (W) Water Dist. — M

Use of water: (A) Air cond, (B) Bottling, (C) Comm, (D) Dewater, (E) Power, (F) Fire, (H) Dom, (I) Irr, (M) Med, (N) Ind, (P) P S, (R) Rec, (S) Stock, (T) Instit, (U) Unused, (V) Repressure, (W) Recharge, (X) Desal-P S, (Y) Desal-other, (Z) Other — P

Use of well: (A) Anode, (D) Drain, (G) Seismic, (H) Heat Res, (O) Obs, (P) Oil-gas, (R) Recharge, (T) Test, (U) Unused, (W) Withdraw, (X) Waste, (Z) Destroyed — W

DATA AVAILABLE: Well data ___ Freq. W/L meas.: APRIL, 1968 Φ Field aquifer char. ___

Hyd. lab. data: ___

Qual. water data; type: ___ C

Freq. sampling: 7-24-68 Φ Pumpage inventory: yes no, period: ___

Aperture cards: ___ yes

Log data: DRL'S & E LOGS — D E

WELL-DESCRIPTION CARD — TEST HOLE 1023

SAME AS ON MASTER CARD — Depth well: 1,000 ft 1000 Meas. rept — DRL — 3

Depth cased: (first perf.) 120 ft 120 Casing type: STEEL ; Diam. 10 3/4 in 10

Finish: (C) porous concrete, (F) gravel w. (perf.), (G) gravel w. (screen), (H) horiz. gallery, (O) open end, (P) perf., (S) screen, (T) sd. pt., (W) shored, (X) open hole, (Z) other — G

Method Drilled: (A) air rot, (B) bored, (C) cable, (D) dug, (R) hyd rot, (J) jetted, (P) air percussion, (R) reverse rotary, (T) trenching, (V) driven, (W) drive wash, (Z) other — H

Date Drilled: MARCH 1968 — 368 Pump intake setting: 420 ft

Driller: TEXAS WATER WELLS (name) (address)

Lift (type): (A) air, (B) bucket, (C) cent, (J) jet, (L) multiple (cent.), (M) multiple (turb.), (N) none, (P) piston, (R) rot, (S) submerg, (T) turb, (Z) other — PEERLESS — T Deep Shallow

Power (type): diesel, elec, nat gas, gasoline, hand, LP gas, wind; H.P. 100 — V Trans. or meter no.

Descrip. MP ___ ft above below LSD. Alt. MP ___

Alt. LSD: 353 — 353 Accuracy (source) ___ 4

Water Level APT 200 ft above below MP; Ft above below LSD 200 Accuracy: ___ 3

Date meas: APRIL, 1968 — 468 — METERED Yield: 525 gpm 525 Method determined ___

Drawdown: APT. 158 ft 158 Accuracy ___ Pumping period 100 MIN hrs 2

QUALITY OF WATER DATA: Iron ___ ppm Sulfate ___ ppm Chloride ___ ppm Hard. ___ ppm

Sp. Conduct ___ K x 10^6 Temp. ___ °F Date sampled ___

Taste, color, etc. ___

Well No.

RECORD OF COMMUNICATION	(Record of Item Checked Below) _x_Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify) Ref. 15	
TO: Bill Thane, County Extension Agent Washington Court House, Brenham, Texas 77833*	From: Lee Larry K. Landry, FIT Chemist EPA Region VI Ecology and Environment, Inc Dallas, Texas 75201 (214) 742-6601	Date: July 21, 1988 Time: 1135 hrs. 11:40 hrs.

SUBJECT Recreational use of Little Sandy Creek and its tributaries,**

SUMMARY OF COMMUNICATION

There is no public use in Little Sandy Creek, or its tributary, New Year Creek, but the Brazos River has public fishing. The only use along Little Sandy Creek and its tributaries would be fishing, possibly from property owners along the creeks. The fishing in the creeks would probably be in potholes along the creek, because the creek tends to dry up in the summer.

*(409) 836-6128

**New Years Creek and the Brazos River.

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

Ref. 16

RECORD OF COMMUNICATION	(Record of Item Checked Below) _x_Phone Call ___Discussion ___Field Trip ___Conference ___Other(Specify)	
TO: Paula Thetford, Field Investigator Texas Water Comm. SE Reg. Deer Park Off: (713) 479-5981	From: Larry Landry, FIT Chemist Ecology & Environment, Inc. Dallas, Texas 75251 (214) 742-6601	Date: August 16, 1988 Time: 1443 - 1446 hrs.

SUBJECT Sampling Inspection of December 12, 1986.

SUMMARY OF COMMUNICATION

Question: Were the sample locations, in reference to downstream from the outfall, changed from "yards" to "feet" during Texas Water Commission Sampling Inspection (December 12, 1986)?

Answer: Yes, they were changed from yards to feet during the State's Sampling Inspection of December 12, 1986.

Ref 16

CONCLUSIONS, ACTION TAKEN OR REQUIRED

INFORMATION COPIES
TO:

EPA FORM 1300-6 (7-72)
Replaces EPA HQ Form 5300-3 which may be used until Supply is Exhausted.

ADDITIONAL STREAMBED SEDIMENT AND GROUNDWATER INVESTIGATION WORKPLAN

April 1995

Prepared for

Hussmann Corporation
12999 St. Charles Rock Road
Bridgeton, Missouri

Prepared by:

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1700 American Bank Plaza
Corpus Christi, Texas 78475
(512) 883-1353

ADDITIONAL STREAMBED SEDIMENT
AND GROUNDWATER
WORKPLAN

April 28, 1995

Prepared by GERAGHTY & MILLER, INC.

Kenneth J. Brandner

Kenneth J. Brandner
Geological Engineer

Thomas A. Carothers /dk

Thomas A. Carothers
Principal Hydrologist

V. Steve Reed /BG

V. Steve Reed
Senior Project Advisor I

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ADDITIONAL STREAM SEDIMENT AND GROUNDWATER INVESTIGATION WORKPLAN

INTRODUCTION

As agreed in a March 1, 1995 meeting with the Texas Natural Resource Conservation Commission (TNRCC), provided herein is a work plan to further investigate sediment and groundwater quality at the Reconversion Technologies of Texas, Inc. (formerly The Old Brazos Forge and Recycled Products) site located at 1709 Highway 36 N. in Brenham, Texas (Figures 1 and 2). Several investigations have previously been conducted at the site as detailed in reports submitted to the TNRCC entitled "Ground Water Assessment" dated October 28, 1988 and "Ground Water Assessment, Phase II" dated December 15, 1989 on which TNRCC comments were received March 1, 1995. This work plan also presents a summary of existing sediment, surface water, and groundwater quality data collected at the site. The summary of existing data includes responses to questions given in a March 1, 1995 memorandum from the TNRCC staff regarding the October 28, 1988 (Phase I) and December 15, 1989 (Phase II) groundwater assessment reports.

EXISTING DATA SUMMARY

SEDIMENT QUALITY

Surface water drainage from the site is northerly to an unnamed intermittent stream located near the north property boundary. The unnamed intermittent steam flows northeasterly and discharges to Little Sandy Creek approximately 3,000 feet northeast of the site (Figure 1). The former permitted NPDES outfall at the site (NPDES Permit No. 02542) was at the unnamed intermittent stream northeast of the former surface impoundments at the approximate location shown on Figure 3. The NPDES discharge occurred from April 1982 to November 1988. Soils were excavated from the unnamed intermittent stream and removed from the site in December 1983.

Sediment samples were collected from the unnamed intermittent stream during 1984, December 12, 1986, September 23, 1987, December 15, 1987, December 16, 1988, and June 1994 for analysis of total chromium, copper, nickel, and zinc. Sediment sample analytical results are summarized on Tables 1 through 4, and copies of the laboratory reports (excluding TNRCC samples) are given in Appendix A.

As shown on Table 1, sediment samples collected during the December 12, 1986 and December 16, 1988 sampling events also were analyzed for EP Toxicity chromium. The EP Toxicity results indicated no significant leaching of chromium was occurring. The EP Toxicity test included an 18-hour extraction using an acetic acid solution with a pH of 5. The current Synthetic Precipitation Leaching Procedure (SPLP) test (EPA Method 1312) also includes an 18-hour extraction with a 60/40 weight mixture of sulfuric and nitric acid solution with a pH of 5. Therefore, based on the extraction procedures, the mobility of metals in soil as determined using the EP Toxicity and SPLP tests should be similar.

SURFACE WATER QUALITY

Surface water from the site flows northeasterly in an unnamed intermittent stream to Little Sandy Creek approximately 3,000 feet northeast of the site. As detailed in the December 15, 1989 Phase II Groundwater Assessment report, surface water samples were collected in replicate during 1989 from three locations along Little Sandy Creek. As specified in the Phase II Groundwater Assessment Workplan dated February 23, 1989, which was approved by the TNRCC in a letter dated August 2, 1989, the replicate samples were analyzed for major ions and dissolved chromium, copper, nickel, and zinc. Analytical results are summarized on Table 5, and copies of the chain-of-custody documents are presented in Appendix B.

As shown on Table 5, chromium, copper, nickel, and zinc were not detected in any of the surface water samples, and the concentrations of major ions at the sample locations were similar.

GROUNDWATER QUALITY

Groundwater quality assessments were conducted at the site as detailed in reports submitted to the TNRCC entitled "Ground Water Assessment" dated October 28, 1988 and "Ground Water Assessment, Phase II" dated December 15, 1989. As shown on Figure 2, there are twelve monitor wells at the site. Nine of the monitor wells are completed in the uppermost water-bearing unit which occurs between a depth of approximately 30 and 40 feet below ground level, and three monitor wells are completed in the second shallowest water-bearing unit which occurs below a depth ranging from approximately 51 to 74 feet below ground level. The uppermost and second shallowest water-bearing units are separated by an unsaturated silty clay stratum with an average thickness of approximately 25 feet.

Uppermost Water-Bearing Unit

General

The uppermost water-bearing unit at the site consists of a light gray to tan, fine to coarse-grained sand. The sand stratum is approximately 10 feet in thickness, and occurs at a depth of approximately 30 to 40 feet below ground level. Groundwater in the uppermost water-bearing unit occurs under unconfined conditions because (1) the sand is not fully saturated and (2) monitor wells completed in the sand have water levels that correspond to the depth at which saturation was first encountered during drilling.

Water level measurements from monitor wells completed in the uppermost water-bearing unit (MH-2, MH-3, MH-5, MH-6, MH-9, MH-10, MH-12, MH-13, MH-16) on January 26, 1995 are given on Table 6. A water table map for the uppermost water-bearing unit on January 26, 1995 is presented as Figure 4, and monitor well completion diagrams are presented in Appendix C. Copies of the State of Texas Well Reports for monitor wells constructed during the Phase II Groundwater Assessment also are included in Appendix C. As shown on Figure 4, shallow groundwater flow at the site is in a general easterly direction at an average hydraulic gradient of approximately 0.008 ft/ft. Based on the water level measurements, monitor wells MH-2 and MH-9 are located hydraulically upgradient relative to the closed surface impoundments. A slight groundwater ridge is apparent in the uppermost water-bearing unit in the area of monitor well MH-13. This well exhibits a higher water level elevation than wells located to the north, west, and south. A slight topographic rise occurs east of monitor well MH-13. This topographically higher area may be a localized recharge area for the shallow groundwater.

Aquifer tests (slug withdrawal tests) were performed on monitor wells MH-2, MH-3, and MH-10 to obtain permeability data for the uppermost water-bearing unit. As detailed in the October 28, 1988 Groundwater Assessment Report, the rising head slug test data was evaluated using the instantaneous line source method described by J. G. Ferris and D. B. Knowles in "Theory of Aquifer Test", U.S. Geological Survey Water Supply Paper 1536, 1962. Based on the slug test evaluation, the average transmissivity of the uppermost water-bearing unit was calculated at 104.8 gallons per day per foot. Based on an average saturated thickness of four feet, the permeability of the uppermost water-bearing unit was calculated to be 26.2 gallons per day per square foot.

Underlying the shallowest water-bearing unit is an unsaturated, low-permeability silty clay stratum averaging approximately 25 feet in thickness. Geologic cross sections depicting the subsurface geology at the site are shown on Figures 5, 6, and 7.

Groundwater Quality

As part of the facility groundwater monitoring program, groundwater samples currently are collected from monitor wells MH-2, MH-3, MH-5, MH-6, MH-9, and MH-10. Groundwater samples also were collected during 1989 from monitor wells MH-12 and MH-13 as part of the Phase II Groundwater Assessment. A cumulative summary of groundwater analytical results for chromium, copper, nickel, and zinc are shown on Tables 7 through 10, respectively.

As shown on Table 7, chromium has not been detected in groundwater samples collected since January 1993. Groundwater samples collected on January 5, 1993 from monitor wells MH-5 and MH-12 were reported to contain 0.06 milligrams per liter (mg/L) and 0.08 mg/L total chromium, respectively, which are below the Federal Drinking Water Standard of 0.1 mg/L. A copy of the laboratory report for the January 1993 sampling event is presented in Appendix D.

As shown on Table 8, copper has not been detected in groundwater samples collected at the site since April 1993. The April 27, 1993 groundwater sample from monitor well MH-3 was reported to contain 0.06 mg/L copper, which is below the Federal Secondary Drinking Water Standard of 1 mg/L.

As shown on Table 9, nickel has been detected in the groundwater samples from several monitor wells. The groundwater samples from monitor well MH-3, located hydraulically downgradient of the closed surface impoundments, generally show the highest nickel concentrations. The April 26, 1994 groundwater sample from monitor well MH-3 was reported to contain 0.06 mg/L nickel, which is below the Federal Drinking Water Standard of 0.1 mg/L.

As shown on Table 10, zinc has been detected in the groundwater samples from several monitor wells, including background monitor wells MH-2 and MH-9. Since 1988, reported zinc concentrations in the groundwater samples have consistently been below 0.5 mg/L. The Federal Secondary Drinking Water Standard for zinc is 5 mg/L.

Based on the fact that the metals in the property boundary monitor wells were below action levels (MCLs), Hussmann recommended the Phase II Groundwater Assessment report that the site continue in a monitoring-only status. Data collected since that time continues to support a monitoring-only status.

Second Shallowest Water-Bearing Unit

General

Three monitor wells (MH-11, MH-14, MH-15) are completed in the second shallowest water-bearing unit at the site. Monitor well completion diagrams and State of Texas Well Reports for these monitor wells are presented in Appendix C. The second shallowest water-bearing unit at the site consists of a yellow-tan to tan, fine to coarse-grained sand. The sand stratum is approximately 20 feet in thickness, and occurs below a depth ranging from 51 feet below ground level at MH-15 to 74 feet below ground level at monitor well MH-11.

Water level measurements from monitor wells completed in the second shallowest water-bearing unit on January 26, 1995 are given on Table 6, and a piezometric surface map for January 26, 1995 is shown on Figure 8. As shown on Figure 8, groundwater flow in the second shallowest water-bearing unit is northeasterly at a gradient of approximately 0.002 ft/ft. The depth to water in monitor well MH-11 is several feet above the top of the sand, indicating the second shallowest-water bearing unit is confined at that location. The depth to water in monitor wells MH-14 and MH-15 is below the depth of the top of the sand, indicating the second shallowest water-bearing unit is unconfined at those locations.

Groundwater Quality

As detailed in the Phase II Groundwater Assessment Report, replicate groundwater samples were collected from monitor wells MH-11, MH-14, and MH-15 during September and October 1989 for analysis of common groundwater cations and anions, pH, total dissolved solids, and dissolved chromium, copper, nickel, and zinc. Groundwater analytical results are summarized on Table 11. As shown on Table 11, chromium and copper were not detected in any of the groundwater samples. Nondetectable to trace levels of zinc (less than 0.05 to 0.1 milligrams per liter (mg/L) and nickel (less than 0.05 to 0.06 mg/L) were detected in the groundwater samples.

A T-test was utilized to statistically evaluate the groundwater analytical data obtained from the second shallowest water-bearing unit during the Phase II Groundwater Assessment. The T-test evaluation showed no significant increases in metals concentrations in the hydraulically downgradient monitor wells relative to the hydraulically upgradient monitor well. The T-test was conducted as described in "Resource Conservation and Recovery Act (RCRA) Ground-Water Monitoring Technical Enforcement Guidance Document", U.S. Environmental Protection Agency, September 1986. T-values for upgradient monitor well MH-15 were not given in the Phase II Groundwater Assessment Report. The T-test evaluation presented in the Phase II Groundwater Assessment Report included the calculation of a mean and variance for each parameter in the upgradient well (MW-15). The mean and variance for each parameter in the upgradient well were used along with the mean and variance for each parameter in the downgradient wells to calculate T-values, which were then compared to T-tables.

ADDITIONAL STREAM SEDIMENT AND GROUNDWATER INVESTIGATION

GENERAL

An investigation will be conducted at the site to further assess metals in the stream sediment and to fully evaluate metals in the groundwater. The proposed scope of the investigation will involve the following tasks:

- Collection of sediment samples from three locations along the unnamed intermittent stream at depths of 0- to 0.5-feet and 1.5-to 2-feet. The sediment samples will be analyzed for arsenic, cadmium, chromium, copper, nickel, and zinc by the SPLP method using EPA method 1312 (SPLP).

- Construction of two additional monitor wells. The monitor wells will be completed in the uppermost water-bearing unit, and groundwater samples will be collected from the newly constructed monitor wells for analysis of chromium, copper, nickel, zinc, and common ions (carbonate, bicarbonate, calcium, chloride, iron, magnesium, manganese, sodium, sulfate, pH, and total dissolved solids).

- Measurement of static water levels at all existing and newly constructed monitor wells. The static water level measurements will be utilized in the preparation of piezometric surface maps for the uppermost and second-shallowest water bearing units.

- Collection of groundwater samples from all existing monitor wells for analysis of chromium, copper, nickel, and zinc.

STREAM SEDIMENT SAMPLE COLLECTION AND ANALYSIS PROCEDURES

Additional sediment samples will be collected from the intermittent stream at the following three locations: (1) at the former NPDES outfall, (2) midway between the former NPDES outfall and State Highway 36, and (3) at the facility property boundary directly west of State Highway 36. Proposed sediment sample locations are shown on Figure 3.

The sediment samples will be collected at each location at depths of 0-to 0.5-feet and 1.5- to 2-feet. The samples will be collected from the approximate midpoint of the stream using a stainless steel hand auger. Prior to each use, the auger will be cleaned using a laboratory-grade detergent wash, water rinse, and distilled water final rinse. The samples will be placed directly into 8-ounce widemouthed glass jars with Teflon-lined lids. The jars will be securely capped, labeled, placed into a cooler with ice, and submitted to an independent analytical laboratory. Chain-of-custody documents will accompany the sample shipment.

The samples will be analyzed for arsenic, cadmium, chromium, copper, nickel, and zinc using EPA SPLP Method 1312. The SPLP analytical data will be evaluated to determine the potential for metals in sediment.

ADDITIONAL GROUNDWATER INVESTIGATION

Monitor Well Construction Procedures

Two additional monitor wells will be completed in the uppermost water-bearing unit at the site. The proposed monitor well locations are shown on Figure 3. Based on water level measurements from site monitor wells, the proposed monitor well south of existing monitor well MH-12 is hydraulically downgradient of the site building and former monitor wells MH-7 and MH-8. The proposed monitor well between existing monitor wells MH-5 and MW-13 is hydraulically downgradient of the former surface impoundments.

The monitor wells will be constructed by a TNRCC-licensed water well driller using a hollow-stem auger drilling rig. Prior to each use, the augers will be steam-cleaned. Soil samples will be collected continuously during advancement of each boring using either a Shelby tube, split spoon, or a continuous sample barrel. Prior to each use, the sampling equipment will be cleaned using a laboratory-grade detergent wash, water rinse, and distilled water final rinse.

Immediately upon collection, each soil sample will be extruded and lithologically described, including use of the Unified Soil Classification System. The borings will be advanced at least two feet into the first unsaturated, low-permeability stratum (clay) underlying the uppermost water-bearing unit. The monitor wells will be completed using two-inch-diameter flush-joint threaded Schedule 40 PVC pipe with 0.010-inch mill slotted PVC screens opposite the saturated zone. The top of the screens will be placed approximately 2 to 5 feet above the top of the saturated zone to account for seasonal water level fluctuations. The total screen length shall not exceed 20 feet, unless approved by the TNRCC.

A filter pack consisting of washed silica sand (20/40-sieve size or equivalent) will be slowly poured down the annular space opposite the screens at the same rate that the hollow-stem augers are removed from the boring, or a pre-packed sand filter screen will be installed. The filter pack will extend approximately two-feet above the top of the screened interval. The annular seal above the sand pack will consist of at least two feet of bentonite pellets hydrated with distilled water. This will be followed by Portland Type 1 cement with 2-to 5-percent bentonite to within 2 feet of ground level.

After allowing at least 24 hours for the cement/bentonite grout annular seal to settle, the surface completions for the monitor wells will include a 4-foot by 4-foot concrete pad sloping away from the well and a protective steel casing or manhole cover placed over the wellhead. Each newly constructed and existing monitor well will be labeled and equipped with a locking cap.

Drill cuttings will be placed into labeled Department of Transportation-approved 55-gallon steel drums. A composite soil sample will be collected from the drill cuttings for analysis of Toxicity Characteristic Leaching Procedure (TCLP) metals. Disposition of the drill cuttings will be evaluated based on the soil analytical results.

Monitor Well Development Procedures

The existing and newly constructed monitor wells will be developed prior to groundwater sample collection using either a Teflon bailer or a stainless steel/Teflon submersible pump. No water will be added to the well bore to aid in development. Prior to each use, the well development equipment will be cleaned using a laboratory-grade detergent wash, water rinse, and distilled water final rinse. The newly constructed monitor wells will be developed by removing a minimum of three well bore volumes of water. Development of the newly constructed monitor wells will continue until the temperature, pH, and conductivity of the produced water have stabilized. Development water from the newly constructed monitor wells will be placed into labeled 55-gallon steel drums. Disposition of the development water will be evaluated based on the groundwater analytical results from those wells.

The existing monitor wells will be developed by removing three well bore volumes of water. Poorly productive existing monitor wells will be developed by bailing or pumping to dryness. Metals concentrations in groundwater samples from the existing monitor wells have recently been low to nondetectable, therefore, the monitor well development water from these wells will be discharged at the wellhead.

Water Level and Total Depth Measurement Procedures

A permanently marked point (measure point) on the PVC top-of-casing of the newly constructed monitor wells will be surveyed to the nearest 0.01 foot by a registered public surveyor. The surveyed elevations will be referenced to mean sea level (MSL). Water levels will be measured at each newly constructed and existing monitor well to the nearest 0.01 foot relative to the surveyed top-of-casing using an electronic water level sensor. Prior to each use, the water level sensor will be cleaned using a laboratory-grade detergent wash, water rinse, and a distilled water final rinse. At the time of the water level measurements, the total depth of each monitor well will be measured to the nearest 0.1 foot relative to the surveyed top-of-casing using a weighted steel tape. Prior to each use, the steel tape will be cleaned using a laboratory-grade detergent wash, water rinse, and distilled water final rinse.

Groundwater Sample Collection and Analysis Procedures

Within 24 hours following development, groundwater samples will be collected from each newly constructed and existing monitor well using a Teflon or stainless steel bailer. Samples will first be collected from the hydraulically upgradient monitor wells. Prior to collection of each sample, the bailer will be cleaned using a laboratory-grade detergent wash, water rinse, and distilled water final rinse.

The groundwater samples will be collected by slowly lowering the bailer into the water column to minimize agitation of the sample. The samples will be collected from the approximate midpoint of the water column. Groundwater samples from the newly constructed monitor wells will be analyzed for dissolved chromium, copper, nickel, zinc, and common ions as shown on Table 12. Groundwater samples from the existing monitor wells will be analyzed for dissolved chromium, copper, nickel and zinc. Field measurements of the groundwater samples for pH, conductivity, and temperature will be performed at the time of groundwater sample collection. The pH will be measured using a ColeParmer Model 5830 or equivalent pH meter. The conductivity and temperature measurements will be performed using a YSI Model 33 or equivalent conductivity/temperature meter. The pH and conductivity/temperature meters will be calibrated prior to use as per the manufacturers specifications.

The samples for metals analysis will be filtered prior to acidification to remove the suspended solids which may be present in the samples. This procedure will make the data comparable with the groundwater data collected since 1985. This procedure is in accordance with that approved by the TNRCC in a letter dated August 2, 1989. Suspended solids, which are not mobile in the groundwater, typically contain clay particles with naturally-occurring metals. The naturally-occurring metals on clay particles potentially could go into solution during sample acidification. Therefore, filtering of the samples allows the metals analytical results to be representative of groundwater quality. Unfiltered samples allow the metals analytical results to be proportional to the quantity of sediment in the sample and not representative of groundwater quality. Each groundwater sample for metals analysis will be field-filtered immediately upon collection using a new 0.45-micron filter. The filtered water will then be placed directly into a 1-liter polyethylene or glass container and acidified to a pH less than 2 using nitric acid.

As shown on Table 12, groundwater samples for non-metallic common ions will be placed directly into a 1-liter polyethylene container. All sample containers will be securely capped, labeled, placed into a cooler with ice, and submitted to an independent analytical laboratory for analysis. Chain-of-custody documents will accompany the sample shipment.

Two field quality control samples also will be prepared on-site at the time of groundwater sample collection. These include a sample duplicate and an equipment blank.

The sample duplicate will consist of groundwater samples from a monitor well placed successively into two identical containers with the same preservatives. The sample containers will be labeled and submitted to the laboratory as separate samples for analysis of chromium, copper, nickel, and zinc.

Following bailer decontamination using the procedures described above, the equipment blank will be prepared by placing distilled or deionized water into the bailer used for groundwater sampling. The water will be poured directly from the bailer into a l-liter polyethylene or glass container with nitric acid. The sample container will be labeled and submitted to the laboratory for analysis of chromium, copper, nickel, and zinc.

Groundwater Data Statistical Evaluation

Following receipt of the final groundwater laboratory reports, the metals analytical data (chromium, copper, nickel, zinc) will be statistically evaluated using the applicable procedures given in "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities-Interim Final Guidance, U.S. Environmental Protection Agency, February 1989" and "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance, U.S. Environmental Protection Agency, July 1992." The background well data set to be utilized for the uppermost water-bearing unit will consist of all dissolved (filtered) metals concentrations from hydraulically upgradient monitor wells MW-2 and MW-9. Unfiltered metals concentrations (generally groundwater samples collected prior to 1986) will not be utilized in the statistical evaluation because the suspended sediment in those samples may have affected the analytical results (naturally-occurring metals on clay particles may have gone into solution during sample acidification). The background well data set to be utilized for the second-shallowest water-bearing unit will consist of all dissolved metals concentrations from the hydraulically upgradient monitor well as allowed in the documents entitled "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities-Interim Final Guidance, U.S. Environmental Protection Agency", dated February 1989 and "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance, U.S. Environmental Protection Agency, dated July 1992. The hydraulically upgradient monitor well will be determined based on static water level measurements obtained during this investigation.

REPORT

Within 45 days of the receipt of all laboratory analysis acquired during this investigation, an assessment report will be submitted to the TNRCC. The report will document the results of the additional stream sediment and groundwater investigation. The report will contain the following information:

- A scaled map showing surface topography of the site and surrounding areas.

- A scaled site map showing the location of waste management areas, stream sediment sample locations, and monitor wells.

- A detailed description of monitor well construction procedures, and stream sediment and groundwater sample collection and analysis procedures. Monitor well completion diagrams and State of Texas Well Reports will be presented as a report appendix.

- A detailed description of the site hydrogeology, including geologic cross-sections. Current piezometric surface maps for the uppermost and second shallowest water-bearing units and lists. A table will be prepared of the surveyed measure point (PVC top-of-casing) elevations in MSL and groundwater elevations in MSL.

- Stream sediment and groundwater analytical results will be summarized in tabular form. Analytical laboratory reports and chain-of-custody documents will be presented as a report appendix.

- An assessment of stream sediment and groundwater quality at the site.

- An account of the disposition of drill cuttings and monitor well development water generated during the investigation.

PROJECT SCHEDULE

The schedule for implementation and completion of the additional stream sediment and groundwater investigation is shown on Figure 9. Preparation for the field activities will be initiated within two weeks of written TNRCC approval to proceed and right of access to the property. The TNRCC Region 9 office in Waco will be notified at least 10 days prior to conducting any on-site investigative activities.

TECHNICAL RESPONSES TO TNRCC LETTER (JUNE 5, 1995);
OLD BRAZOS FORGE FACILITY,
BRENHAM, TEXAS

SEDIMENT SAMPLING WORKPLAN

1) The workplan fails to include analysis of total metals for the sediment samples, only analysis of leachate concentrations. Without this information, the contamination extent cannot be assessed.

As discussed in detail in recent meetings with the Agency, contamination associated with unauthorized discharges at the facility in the early 1980's was remediated in coordination with the local office of the TDWR, and no further remediation was required. Hussmann has previously supplied correspondence to and from the Agency documenting this fact. Additional support, in the form of an affidavit from the then facility manager and copies of manifests for soil removed, is attached as Attachment B. No confirmation sampling was apparently required by the Agency at the time. However, as the affidavit points out, soil excavation occurred over a large area, producing at least 380 cubic yards of affected soil. According to the affidavit, the Agency representative, after inspecting the site, did not require any further remediation. Sediment samples were collected at various intervals since that time, by both the Agency and the facility. Evaluation of this data did not result in the need for further remediation. As summarized in the tables presented to the Agency in previous meetings, total metals concentrations in the most recently collected streambed soil sample (December 16, 1988 and June 1994) are consistently below TNRCC promulgated health-based levels. In addition EP toxicity metals concentrations are below federal groundwater maximum contaminant levels, demonstrating no potential for cross-media contamination. Based on this data and the discussions in our previous meetings, it is our understanding that the primary goal of the investigation of the stream sediment is to reconfirm that metals in the sediment are not leaching into the surface water and shallow groundwater system. In recognition of this understanding, an agreement was reached at the March 1, 1995 meeting (and confirmed by letter from Laura Ray on May 19, 1995) that a <u>leachate</u> sampling protocol for the site was appropriate.

2) The workplan fails to include samples along the banks of the stream and samples below the two foot interval. These areas may have been impacted by the unauthorized discharges.

As stated above (1) the goal is to determine the maximum concentrations of leachable metals in the streambed sediments. The nominal center of the drainage is the appropriate location to sample, because the impact from the permitted discharge would be greatest in the center of the creek, and in the shallow sediments.

3) The workplan does not contain a provision for further sampling of the soils if contamination is not vertically and horizontally delineated in this investigation.

Based on previous sampling, Hussmann believes leachable metals will be at low to non-detectable concentrations. The purpose of this investigation is to confirm this. In the event this investigation yields a different conclusion, Hussmann will approach TNRCC to discuss the implications of these results.

4) The workplan fails to address the collection for background samples. Without this information, a determination of soil contamination cannot be made.

Background total metals concentrations have been established previously upstream of the NPDES outfall. For leachable metal concentrations, the target concentration is not background total metals, but is instead the MCL as measured in the leachate.

5) *The workplan fails to address items in Attachment E of the Executive Director's Report, Nos. 6, 7, 8, and 9 regarding data validation, field and laboratory notebook contents, health and safety requirements, and field sampling notebooks, respectively.*

While the workplan did not specify the items listed in this comment, the data validation, field and laboratory notebook contents, health and safety requirements, and field sampling notebook references listed in Attachment E of the Executive Directors Report are provided in Attachment C.

6) *The data in Appendix A dated March 3, 1988 indicated that the EP Tox concentrations for chromium and nickel exceeded the MCL. Thus, either the corresponding soil at sample location no. 7, which had 179 ppm, of chromium and 184 ppm of nickel, should be remediated to meet the Risk Reduction Standard No. 2 or a substitute standard for remediation would have to be developed pursuant to 30 Texas Administrative Code β 335.559 (f) (2).*

The sample TNRCC staff refers to was dated March 3, 1988, but was collected December 15, 1987. The next sample from that location was collected December 16, 1988 (see Table 1-4 in work plan) and showed lower total chromium and non-detectable EP tox chromium. Total nickel concentrations were similar. As a consequence, subsequent sample analysis demonstrates that the December 1987 sample is not representative of the current conditions. The proposed sampling plan is designed to determine present day leachability and therefore directly addresses the current status of the stream sediment.

7) *The workplan does not include cyanide as a test parameter. This constituent was in unauthorized discharges of waste water and therefore should be included as a test parameter.*

This constituent has not been detected in any groundwater samples collected since 1987. Because of this, cyanide was dropped as a constituent of concern. The TNRCC approved this deletion in its approval of the site's Groundwater Assessment, Phase II workplan.

GROUND-WATER ASSESSMENT WORKPLAN

1) *The workplan fails to include monitor wells completed in the lower aquifer and wells located off-site. Since hexavalent chromium was found in a downgradient off-site well and your workplan indicated on page 6 that the lower aquifer is unconfined at certain locations, these areas should be investigated.*

There are three monitor wells completed in the lower water-bearing zone at the site. Two of the wells are located down-gradient of the areas of concern and no groundwater impact has been reported in any of these wells. The proposed additional shallow zone monitor wells described in the workplan will be located downgradient to demonstrate that no contaminants are migrating off-site in the upper water-bearing zone. Because there has been no impact to the lower zone and the additional wells in the upper zone will verify any impact down-gradient at the site boundary, there is no need to drill off-site wells. Additionally, the January 26, 1995 piezometric surface map presented in the Workplan shows groundwater flow in the lower aquifer (deep zone) is northeasterly. Therefore, off-site wells are not downgradient in the lower aquifer.

2) *The workplan fails to include cyanide as a test parameter.*

Groundwater samples were analyzed for cyanide for several years at this site and all the groundwater samples collected since 1987 contained no detectable cyanide. As noted in response No. 7 above, the deletion of cyanide as a constituent of concern in the Phase II Workplan was approved by the TNRCC, and therefore was not included in this workplan.

3) *The workplan includes sampling of all existing monitor wells. These wells need to be inspected (Attachment A for reasons), may need rehabilitation and have been found to be contaminated with chromium. Due to these circumstances, these wells should not be included for further assessment of groundwater contamination, unless and until the inspection and rehabilitation has occurred.*

Please see our responses below to Attachment A beginning on Page 6. Based on observations during previous sampling events and for the reasons discussed in our responses below to Attachment A, we do not believe the existing monitor wells require rehabilitation. However, when the samples are collected per the workplan, the well total depths will be measured and if in any well more than 20 percent of the screened interval is filled in with silt and clay, that well will be redeveloped prior to sampling. In addition, the wells are not "contaminated" with chromium. The most recent sample results indicate no chromium concentrations exceed the federal Maximum Contaminant Level (MCL) (workplan Table 7).

4) *The workplan fails to include well screens of 10 feet or less, as specified in Attachment B, Item 5 of the Executive Director's Report and per EPA RCRA Ground-Water Monitoring Guidance, November 1992.*

Because the shallow water-bearing unit is relatively uniform and there is no evidence of any multi-phase groundwater flow in this zone, the well screen maximum of 20 feet is suitable for this site. Several TNRCC-approved site investigations in Texas have been conducted utilizing 20 foot maximum screen lengths. In addition, the EPA November 1992 Guidance document (p. 5-7) does note that certain hydrogeologic settings may warrant or necessitate the use of screens longer than 10 feet for adequate detection monitoring, including formations with very low hydraulic conductivities and unconfined aquifers with widely fluctuating water tables. The hydraulic conductivity of the shallow water-bearing unit at the site is very low (26.2 gallons per day per square foot) as detailed in the workplan and the Groundwater Assessment report dated October 28, 1988. Water levels in the unconfined shallow aquifer at the site also fluctuate up to four feet or more between wet and dry periods as shown on the water table maps in the Groundwater Assessment and Groundwater Assessment, Phase II reports. Therefore, a well screen maximum of 20 feet is appropriate.

5) *The workplan does not include the measurement of turbidity after the development of the wells and during collection of the samples. Given the problem with the sediment in the facility wells, the turbidity should be 5 NTU (nephelometric turbidity units) or less during well development and sample collection events.*

Although the wells were properly completed, the natural silt and clay in the shallow zone and a relatively thin saturated zone continue to create moderate to high turbidity while purging the wells. Because the samples will be filtered as specified in the workplan, the turbidity will not be an issue and the dissolved concentrations of trace metals will be determined.

6) The workplan does not indicate whether the bailers would have check valves at the bottom. Check valves are needed.

All bailers utilized during this investigation will have check valves at the bottom.

7) The workplan does not include a rinse phase with hydrochloric or nitric acid prior to the final rinse phase with distilled water for decontamination of equipment.

Well-dedicated PVC, polyethylene, or Teflon, bailers will be utilized for monitor well development and groundwater sample collection. Therefore, decontamination will not be required.

8) The workplan indicates that purged well water from existing wells will be disposed at the wellhead. TNRCC data indicate that the groundwater in the facility wells is contaminated, therefore the purged well water should be disposed at an authorized facility.

Because the groundwater from the monitor wells has not characteristically contained levels of contaminants above MCLs or background levels, the purge water does not pose a hazard and it is acceptable to discharge it to the ground. Approval was given to discharge purge water to the ground in a letter from the TNRCC dated December 15, 1989.

9) The workplan indicates that groundwater samples will be filtered prior to analysis. However, filtering is not protective of human health and not appropriate at this facility since unfiltered groundwater is being used for human consumption downgradient of the facility.

As stated in the workplan, groundwater samples are to be filtered for the following reasons:

a. Filtered samples are most representative of the dissolved constituents in the water.

b. The TNRCC approved the use of filtered samples by their approval of a letter dated December 13, 1985, from Reed & Associates to Russ Kimble (TDWR). As a result, the samples collected and analyzed at the site since that time have been filtered and therefore continued use of filtered samples will provide a consistent data set for comparison with historic data.

c. Geraghty & Miller does not believe that clay-size particles on which metals can adsorb are mobile in the shallow water-bearing unit at the site, and therefore would not migrate downgradient of the facility. This is because of the low groundwater velocity (calculated at 0.21 feet per day as detailed in the Groundwater Assessment Report) and fine grain size (silts and sands) of the formation which prevent movement of clay-size particles. Clay-size particles are generally considered to be mobile only in aquifers with high groundwater velocities and/or large diameter pores (i.e., limestone, basalt) where conduit flow occurs. Therefore, because metals in the shallow water-bearing unit at the site migrate only in the dissolved phase, filtering of the groundwater samples collected from site monitor wells is an appropriate methodology that is protective of human health.

d. Importantly, the TNRCC has apparently recognized that evaluating only dissolved constituents in groundwater is appropriate where concerns for human health exist. The TNRCC's Risk Reduction cleanup regulations require only that dissolved concentrations of constituents in groundwater be evaluated. See TAC β 335.559 (d).

10) The workplan indicates that the filtered groundwater sample results will be compared to filtered groundwater sample results obtained from the upgradient wells for all the years subsequent to 1985. The regulations in 30 Texas Administrative Code β 335.116 (f) require the facility to determine background concentrations in the first year of monitoring only. The use of the data from 1986 to the present time for the background data set is contrary to the requirements set forth in 30 TAC 335.116.

The use of background data from filtered samples collected and analyzed subsequent to 1985 (when the Agency approved the use of filtering) is to allow comparison of dissolved metals data to dissolved metals background data. The first year sample results were from background monitoring wells unfiltered samples. It is statistically inappropriate to compare filtered metals data to unfiltered metals data. The use of unfiltered background data could result in higher than actual background metal concentrations that would not be indicative of background dissolved concentrations of metals.

11) The workplan fails to include sampling of off-site downgradient drinking water wells within one mile, as noted in the Executive Director's Report, Technical Recommendation 2b.

Based on the long history of monitoring data from this site, there is no evidence that releases from the site have resulted in any impacts to groundwater above the MCL beyond the property boundary. The two additional proposed site monitor wells will provide evidence of any potential for downgradient migration of contaminants in the shallow water-bearing unit. Until that evidence, if any, is obtained, Hussmann believes it is inappropriate to sample off-site wells, since those results would yield no additional data to determine the source, if any, of constituents in those wells.

12) The workplan fails to address items in Attachment A of the Executive Director's Report (Groundwater Assessment Report, Item Nos. 3, 4, 5, 7, 10, and 12) regarding aquifer characteristics, drinking water well survey, lithologic logs, contaminant distribution map, tabulations of exceedances, provisions for further assessment if the contamination is not defined during this investigation and remediation.

The Groundwater Assessment Report dated October 28, 1988, the Groundwater Assessment Phase II report dated December 15, 1989, and updated monitor well logs submitted to the TNRCC on June 20, 1995 provide information requested in Attachment A of the Executive Director's Report. Also, Items 3 and 12 in Attachment A of the Executive Director's Report are addressed on Page 4 and 5, respectively, of the workplan. Based on existing groundwater analytical data, the additional monitor wells proposed in the workplan should allow complete delineation of constituents in groundwater at the site. In the event this investigation yields a different conclusion, Hussmann will approach TNRCC to discuss the implications of these results.

13) The workplan fails to address items in Attachment B of the Executive Director's Report (Monitor Well Specification Item Nos. 12 and 13) regarding records of construction details and lithologic log contents.

These requirements will be addressed in the report submitted following this investigation.

14) The workplan fails to contain a provision for submitting a report detailing the investigation activities and results.

There is a provision and schedule for submittal of a report to the TNRCC following the field investigation on page 14 of the workplan.

ATTACHMENT A

The general comments regarding the well logs and diagrams are provided below followed by the response. In general, many of the comments should be clarified following a review of the recently submitted updated well logs with elevations and construction details. There appears to be, however a lack of understanding of the distinction between depth below ground and elevation in relation to the upper and lower water-bearing zones. A review of Table 6 and the cross sections in the workplan and in previously submitted reports indicate that the ground surface elevation at the site varies considerably (approximately 317 to 346 feet above sea level). Thus there is not a uniform defined depth to the upper or lower water-bearing zones. Determinations of screened intervals must be referenced to sea level elevations (see Cross Section A-A', B-B', and C-C' in the workplan).

1) Well logs for MH-1, MH-2, MH-3, MH-4, MH-~~4~~ 5, MH-6, MH-7, and MH-8 do not indicate the top of casing (TOC) elevation, the ground elevation, the casing stick up length, installation of a sand or gravel pack, installation of bentonite seal, installation of a bottom cap, installation of a top locking cap and surface completion (i.e., concrete pad, bumper poles, exterior metal casing).

The ground and top of casing elevations, sand pack, bentonite seal, and grout depth for the active monitor wells are provided on the updated logs submitted June 20, 1995. All wells were completed with a bottom cap. Well logs are not included for wells MH-7 and MH-8 because they were properly plugged and abandoned in August 1989 with concurrence of the TNRCC.

2) Well MH-6 screens only top three feet of the saturated zone.

This is not correct. Well MH-6 screens the full saturated thickness of the upper sand. the bottom of the sand is at 29 feet below ground and the screen extends from 30 feet below ground to 10 feet below ground with a current water level approximately 17 feet below ground.

3) Well MH-7 appears to screen the top 5 ft. of the lower aquifer, which is separated by 10 ft. of clay from the upper aquifer. This well has been designated a shallow well in groundwater reports from the facility.

Well MH-7 was plugged in 1989, as noted above. The well however, did not screen the lower zone. As shown on the log of MH-7 in the October 1988 Groundwater Assessment report, there is a shallow sand from 18 to 25 feet, however this sand is unsaturated and is not a water-bearing unit.

4) Well MH-8 is screened only in the top 5 ft. of the lower aquifer, this well has been designated a shallow well in groundwater reports from the facility.

Well MH-8 was plugged in 1989 as noted above. This well was completed similarly to MH-7 and was screened across the full thickness of the upper water-bearing zone.

5) The well construction diagram and lithologic log for Well MH-9 was not submitted to TNRCC. A brief description of this well indicates that the screen extends from 20 ft. below grade (B.G.) to 50 ft B.G. Cross contamination may be occurring since the upper aquifer is usually encountered at 15-25 ft. B.G. and the lower aquifer is usually encountered at 38-48 ft B.G. The slot size used in the well screen was 0.020 mil, while all the other wells had a slot size of 0.010 mil.

The log of well MH-9 was submitted to the TNRCC on June 20, 1995. This well was installed by another firm as an offset to the original well MH-1 and no detailed lithologic log was supplied. The lithology of the adjacent well MH-1 from 0 to 30 feet depth was used; however no lithology is available for the interval from 30 to 45 feet. Based on the elevation of this well and the groundwater elevation history, this well is screened only in the upper zone. The use of a 0.020-inch slot size screen in this well has not been a problem regarding sand flowing through the screen and the well has been suitable for its intended purpose.

6). The well log for MH-10 did not indicate the TOC, the ground elevation, the installation of a bottom cap, the installation of a top locking cap and surface completion.

The TOC and ground elevation are included on the updated log for MH-10. A bottom cap was installed during construction of this well.

7) The well logs for MH-11, MH-12, MH-13, MH-14, MH-15, MH-16 did not indicate the TOC in mean sea level (MSL), the ground elevation, the lithology, the point of saturation or initial water level. The logs indicated a drilling fluid containing a gel (Shur-gel) was used. Without the lithologic log and point of saturation, proper placement of the well screens cannot be verified. The well logs do not indicate how the drilling gel was purged completely from the hole. If left in the hole, a filter cake would develop that would prevent groundwater from entering the casing. Wells MH-13 and MH-16, noted in the Phase II Groundwater Assessment Report as being dry, may have been incorrectly screened or may have had the gel set up in them. The well log for MH-16 indicated the well was initially dry. The well logs, except for the log of MH-13, indicated the purge water was silty, they did not indicate the clear formation water was obtained during development.

The recently submitted June 20, 1995, updated well logs and Table 6 of the workplan indicate the TOC and ground elevation at the referenced wells. The lithology encountered while drilling is shown on the updated logs and was presented on logs in the previously submitted Phase I and II Groundwater Assessment reports. These wells were all completed properly using the fluid rotary drilling method with small amounts of drilling mud additives when necessary to ensure proper removal of cuttings. The lithologic log of the boring was developed during drilling by observation of the cuttings, drilling characteristics, and collection of split spoon samples. The wells were developed using the methodology described in the TNRCC approved assessment workplans and filter cake was not left in the hole as suggested in the comment. Wells MH-13 and MH-16 have been dry during extended dry periods in the Brenham area, however as shown on Table 6 in the workplan, both wells contained groundwater during water level measurements in January 1995. In addition, a review of the geologic cross sections in the workplan and previous plans clearly shows the wells are screened in the shallow or upper water-bearing zone.

8) The well log for MH-12 indicated that the screen was set between 23 ft B.G. and 43 ft B.G. That well may be screened in both the upper and lower aquifers (see #5)

The screen in well MH-12 is not opposite the lower water-bearing unit. Because this well is located in a topographically high area of the site, the top of the upper zone is deeper and the log clearly shows that only one continuous sand sequence is screened (see Cross Section B-B' in workplan).

9) The well log for MH-14 indicates the screen is 28 ft. long. Since the lithologic log did not accompany the construction diagram, it is uncertain whether the well is screened over two aquifers, which may be possible since the average thickness of the upper and lower aquifers is 10 ft.

The lithologic log for well MH-14 was provided in the previous Phase II Groundwater Assessment report and the log clearly indicates the well is screened in the lower water-bearing sand unit. In addition, the sand of the lower water-bearing unit at the site is not an average of 10 feet thick but about 24 feet as shown on Cross Section C-C' of the workplan.

10) The well log for MH-15 indicates the screen is 25 ft. long. It may be possible that the well is screened over two aquifers, since the average thickness of the aquifers is 10 ft.

The screen at well MH-15 is not set across the upper and lower water-bearing units and the average thickness of the lower zone is not 10 feet but over 20 feet as shown on Cross Section C-C' of the workplan.

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STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS

TEXAS DEPARTMENT OF WATER RESOURCES

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REPORT 236

STRATIGRAPHIC AND HYDROGEOLOGIC FRAMEWORK OF PART OF THE COASTAL PLAIN OF TEXAS

By C-FLy

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Table 1.--Stratigraphic and Hydrogeologic Framework of Part of the Coastal Plain of Texas

Era	System	Series	Stratigraphic Units	Hydrogeologic Units	Selected Faunal Markers	Remarks
CENOZOIC	Quaternary	Holocene	Alluvium	Chicot aquifer		Quaternary System undifferentiated on sections.
		Pleistocene	Beaumont Clay			
			Montgomery Formation			
			Bentley Formation			
			Willis Sand			
	Tertiary	Pliocene	Goliad Sand	Evangeline aquifer		Goliad Sand overlapped east of Lavaca County.
		Miocene	Fleming Formation	Burkeville confining system	*Potamides matsoni* *Bigenerina nodosaria var. directa* *Bigenerina humblei* *Amphistegina sp.*	
			Oakville Sandstone	Jasper aquifer		Oakville Sandstone included in Fleming Formation east of Washington County.
			Surface: Catahoula Tuff or Sandstone / Subsurface: Upper part of Catahoula Tuff or Sandstone			Catahoula Tuff designated as Catahoula Sandstone east of Lavaca County.
			Subsurface: Anahuac Formation	Catahoula confining system (restricted)	*Discorbis nomada* *Discorbis gravelli* *Heterostegina sp.* *Marginulina idiomorpha*	Anahuac and "Frio" Formations may be Oligocene in age.
			Subsurface: "Frio" Formation		*Textularia mississippiensis*	
		Oligocene(?)	Surface: Frio Clay / Subsurface: Vicksburg Group equivalent	Not discussed as hydrologic units in this report.	*Textularia warreni*	Frio Clay overlapped or not recognized on surface east of Live Oak County.
		Eocene	Jackson Group: Whitsett Formation: Fashing Clay Member			Indicated members of Whitsett Formation apply to south-central Texas. Whitsett Formation east of Karnes County may be, in part or in whole, Oligocene in age.
			Jackson Group: Whitsett Formation: Calliham Sandstone Member or Tordilla Sandstone Member			
			Jackson Group: Whitsett Formation: Dubose Member		*Marginulina cocoaensis*	
			Jackson Group: Whitsett Formation: Deweesville Sandstone Member			
			Jackson Group: Whitsett Formation: Conquista Clay Member		*Textularia hockleyensis*	
			Jackson Group: Whitsett Formation: Dilworth Sandstone Member		*Massilina pratti*	
			Jackson Group: Manning Clay			
			Jackson Group: Wellborn Sandstone		*Textularia dibollensis*	
			Jackson Group: Caddell Formation			
			Claiborne Group: Yegua Formation		*Nonionella cockfieldensis*	
			Claiborne Group: Cook Mountain Formation		*Discorbis yeguaensis*	
			Claiborne Group: Sparta Sand		*Eponides yeguaensis*	
			Claiborne Group: Weches Formation		*Ceratobulimina eximia*	
			Claiborne Group: Queen City Sand			
			Claiborne Group: Reklaw Formation			
			Claiborne Group: Carrizo Sand			
			Wilcox Group			
		Paleocene	Midway Group			

and W. M. Sandeen (U.S. Geological Survey) of Houston, Texas, delineated the Chicot and Evangeline aquifers on the sections. Their contribution is gratefully acknowledged. Geologic sections and type logs of oil fields including faunal occurrences by the Houston Geological Society (1954, 1962), the Corpus Christi Geological Society (1954, 1955, 1967, 1972), and the South Texas Geological Society (1962, 1967) were extensively utilized as aids in identifying deep subsurface formations. The geologic sections of Eargle, Dickinson, and Davis (1975) served to identify near-surface formations in parts of South Texas.

Metric Conversions

For those readers interested in using the metric system, the metric equivalents of English units of measurements are given in parentheses. The English units used in this report have been converted to metric units by the following factors:

From	Multiply by	To obtain
feet	0.3048	meters (m)
miles	1.609	kilometers (km)

STRATIGRAPHIC FRAMEWORK

General Features of Deposition and Correlation Problems

Cenozoic sediments that underlie the Coastal Plain of Texas are tens of thousands of feet thick at the coastline. These clastic sediments of sand, silt, and clay represent depositional environments ranging from nonmarine at the outcrops of most units to marine where the units may carry a distinctive suite of fossils. Oscillations of ancient seas and changes in amount and source of sediments that were deposited caused facies changes downdip and along strike. For example, a time-stratigraphic unit having age equivalency may consist of sand in one area, sandy clay in a second area, and clay in a third area. Subsidence of the basin of deposition and rising of the land surface caused the stratigraphic units to thicken Gulfward. Growth faults (faults that were more or less continuously active) greatly increased the thickness of some stratigraphic units in short distances. All of these factors contributed to the heterogeneity of the units from place to place, which in turn makes correlation difficult.

Stratigraphic Units

In the discussion to follow, emphasis will be placed on stratigraphic units that are designated in this report as Miocene in age. Many of the correlation problems of the Cenozoic deposits involve these units to a large degree. Also the main thrust of this report is directed at the Miocene in keeping with the ultimate objective of modeling the flow in the Miocene aquifers.

The stratigraphic nomenclature used in this report was determined from several sources and may not necessarily follow the usage of the U.S. Geological Survey.

Pre-Miocene

Delineation of most of the pre-Miocene units of Cenozoic age present relatively few problems of significance. This is especially true of the pre-Jackson units (Midway Group to Yegua Formation). The top of the Carrizo Sand of the Claiborne Group (included with the underlying Wilcox Group on the sections) can be easily delineated, which makes the position of the unit unmistakable in the subsurface. From about the Sabine River to the San Marcos Arch (section F-F', Figure 7, is centered over this structural feature), the top of the Carrizo-Wilcox is about 3,000 feet (914 m) beneath the landward edge of the Catahoula outcrop. Southward from the San Marcos Arch into the Rio Grande Embayment of South Texas, its position steadily increases in depth to more than 7,000 feet (2,134 m) at the western end of section K-K' (Figure 12).

Facies changes occur downdip in the Sparta and Queen City Sands of the Claiborne Group, and where these units grade into clay, delineation on a time-stratigraphic basis is virtually impossible from electrical-log interpretation. The same problem affects the Yegua Formation of the Claiborne Group, although the Yegua remains sandy for greater distances downdip. It can be delineated by lithology on most of the sections in this report. Also, the presence of important faunal markers such as *Nonionella cockfieldensis* and *Ceratobulimina eximia* aid in locating the approximate top and base, respectively, of the Yegua, regardless of its lithology.

The delineation of the Jackson Group is significant in establishing the framework for the Miocene units. This is because the outcropping Frio Clay of Oligocene(?) age of South Texas is completely overlapped in Live Oak County by the Miocene Catahoula (or is not recognized on the surface east of

County to the Sabine River, the percentage of sand in the formation increases eastward. In Jasper and Newton Counties, the amount of sand in the section above the base of the Fleming greatly exceeds the amount of clay. This can be seen in wells 30 and 31 on strike section L''-L''' (Figure 15).

Delineation of the base of the Fleming from the to the deep subsurface has not been attempted on most of the sections because of complex facies changes. In southeast Texas on sections A-A', B-B', and C-C' (Figures 2-4), an approximate base of the Fleming is shown downdip to short distances beyond the pinchout of the Anahuac. The preponderance of sand above the Anahuac in this area, however, makes any delineation on the basis of electrical logs speculative. Deep wells near the coastline penetrate marine facies of the Fleming which carry a diagnostic fauna. Numerous species, which serve to identify the formation, have been described by Rainwater (1964). *Potamides matsoni*, *Amphistegina sp.*, *Bigenerina humblei*, and *Bigenerina nodosaria var. directa* are faunal markers indicated on some of the sections.

Post-Miocene

Delineation of the stratigraphic units of Pliocene, Pleistocene, and Holocene age has not been attempted. Correlation problems with most of these stratigraphic units are too numerous to solve by using only electrical logs. Delineation of the Pleistocene units—Willis Sand, Bentley Formation, Montgomery Formation, and Beaumont Clay—is exceedingly difficult due to the lithologic similarity of the sediments and lack of paleontological control. The contact at the surface of the basal Quaternary with the Goliad Sand or older units is, however, shown on the dip sections.

The Goliad Sand of Pliocene age overlies the Miocene units in the deep subsurface as well as in places on the surface. Except for a few isolated outcrops, it is otherwise entirely overlapped on the surface east of Lavaca County by Pleistocene deposits. Its inland extent beneath the overlap is presumed to be only several miles southeast from the most downdip exposures of the Fleming Formation. From Lavaca County to the Rio Grande, the width of the Goliad outcrop gradually increases because the Goliad progressively overlaps older units in the Rio Grande Embayment of South Texas.

The Goliad Sand can usually be identified on the surface and in the subsurface by a preponderance of sand except in the far eastern part of the State where sand predominates from the base of the Miocene to the surface. In this area, the identity of the Goliad cannot be established with certainty. Delineation of the base of the Goliad has been made, where outcrop control is available, on the strike and dip sections west of Colorado County. The base of the Goliad has been approximated at about 2,200 feet (671 m) below sea level near the coastline on sections I-I' and J-J' (Figures 10, 11).

HYDROGEOLOGIC FRAMEWORK

The following discussion is restricted to the hydrogeologic framework of five units—Catahoula confining system (restricted), Jasper aquifer, Burkeville confining system, Evangeline aquifer, and Chicot aquifer. A discussion of other hydrologic units of Cenozoic age is beyond the purpose and scope of this report.

The quality of the ground water that is indicated on the sections to be less than 3,000 mg/l of dissolved solids is referred to in this report as fresh to slightly saline water. This terminology follows the classification of Winslow and Kister (1956).

Catahoula Confining System (Restricted)

The Catahoula confining system (restricted) is treated in this report as a quasi-hydrologic unit with different boundaries in some areas than the stratigraphic unit of the same name. Its top (base of the Jasper aquifer) is delineated along lithologic boundaries that are time-stratigraphic in some places but that transgress time lines in other places. Its base, which coincides with the base of the stratigraphic unit, is delineated everywhere along time-stratigraphic boundaries that are independent of lithology. No attempt was made to establish a lithologic (hydrologic) base for the unit, which would have created a distinct hydrologic unit. Such effort would have involved a thorough hydrologic evaluation of pre-Miocene formations, which is beyond the scope of the project.

In many places, the Catahoula confining system (restricted) is identical to the stratigraphic unit, but there are notable exceptions. These departures of the hydrologic boundaries from the stratigraphic boundaries are most prominent in the eastern part of the Coastal Plain near the Sabine River (Figure 15), in places in South Texas (Figure 11), and in numerous places at the outcrop and in the shallow subsurface. In these places, the very sandy parts of the Catahoula Tuff or Sandstone (stratigraphic unit) that lie immediately below the Oakville Sandstone or Fleming Formation are included in the overlying Jasper aquifer. This leaves a lower section from 0 to 2,000 feet (610 m) or more in thickness that consists predominantly of clay or tuff with some interbedded sand to compose the Catahoula confining (restricted) system. In most areas, this delineation creates a unit that is generally deficient in sand so as to preclude its classification in these areas as an aquifer. Thus in much of its subsurface extent, the Catahoula confining system (restricted) functions hydrologically as a confining layer that retards the interchange of water between the overlying Jasper aquifer and underlying aquifers.

The amount of clay and other fine-grained clastic material in the Catahoula confining system (restricted) generally increases downdip, until the Anahuac Formation is approached. Below this unit, the "Frio" Formation becomes characteristically sandy and contains highly saline water that extends to considerable depths.

Jasper Aquifer

The Jasper aquifer, which was named by Wesselman (1967) for the town of Jasper in Jasper County, Texas, has heretofore not been delineated farther west than Washington, Austin, and Fort Bend Counties. In this report, a delineation as far downdip as possible has been made of the Jasper from the Sabine River to the Rio Grande.

The configuration of the Jasper aquifer in the subsurface, as shown on the sections, is geometrically irregular. This irregularity is due to the fact that the delineation was necessarily made on the basis of the aquifer being a rock-stratigraphic unit. The hydrologic boundaries were defined by observable physical (lithologic) features rather than by inferred geologic history.

The configuration of the base and top of the Jasper transgresses stratigraphic boundaries along strike and downdip. The lower boundary of the aquifer coincides with the stratigraphic lower boundary of the Oakville or Fleming in some places. In other places the base of the Jasper lies within the Catahoula or coincides with the base of that unit. The top of the aquifer is within the Fleming Formation in places, follows the top of the Oakville Sandstone in other places, and is within the Oakville in still other places.

The Jasper ranges in thickness from as little as 200 feet (61 m) to about 3,200 feet (975 m). The maximum thickness occurs within the region of highly saline water in the aquifer. An average range in thickness of the aquifer within the zone of fresh to slightly saline water is from about 600 to 1,000 feet (183 to 305 m). In the eastern part of the Coastal Plain of Texas the Jasper contains a greater percentage of sand than in the southern part. At the Sabine River, the Jasper attains a thickness of 2,400 feet (732 m) in well 31 on section L''-L''' (Figure 15), where the aquifer is composed almost entirely of sand. Fresh to slightly saline water, as shown on section D-D' (Figure 5), occurs as deep as 3,000 feet (914 m) below sea level.

Delineation of the Jasper aquifer in Louisiana (Whitfield, 1975), in western Louisiana and eastern Texas (Turcan, Wesselman, and Kilburn, 1966), and in Jasper and Newton Counties, Texas (Wesselman, 1967) shows that the thickness of the Jasper at the Sabine River closely approximates that given by the author. For example, the author assigns a thickness of 2,400 feet (732 m) to the Jasper in well 31 on section L''-L''' (Figure 15), and the authors cited above show essentially the same thickness at the site. This agreement in aquifer thickness, however, is contrasted to different interpretations of the stratigraphic composition or age of the aquifer near the Sabine River. The authors cited above restrict the Jasper to a part of the Fleming Formation, whereas this paper redefines the Jasper at its type locality near the Sabine River to include the upper part of the Catahoula of Texas in addition to the lower part of the Fleming of Texas. (This redefinition applies only to the area of the type locality and is thus only locally valid. Elsewhere in the Coastal Plain of Texas the Jasper assumes a different stratigraphic makeup.)

The stratigraphic discrepancies at the Texas-Louisiana border are attributed to different interpretations of the surface geology at the State line. The Palestine quadrangle of the Geologic Atlas of Texas (Barnes, 1968b) shows the Catahoula outcrop to be about 6 miles (9.7 km) wide at the Sabine River, whereas Welch (1942) shows the outcrop in Louisiana to be about 1 mile (1.6 km) wide. A close comparison of the two geologic maps indicates that in Louisiana the Lena, Carnahan Bayou, and at least part of the Dough Hills Members of Fisk (1940) of the Fleming Formation of Kennedy (1892), in addition to the Catahoula of Welch (1942), are equivalent to the Catahoula of Texas. Wesselman (1967) assigned the Carnahan Bayou Member as the basal part of the Jasper, which is reasonable; but this member is Catahoula in age in Texas. As long as the discrepancy in geologic mapping is unresolved, subsurface correlations of the Catahoula-Fleming contact, as well as formation thicknesses, will continue to differ.

Burkeville Confining System

The Burkeville confining system, which was named by Wesselman (1967) for outcrops near the town of Burkeville in Newton County, Texas, is delineated on the sections from the Sabine River to near the Rio Grande. It separates the Jasper and Evangeline aquifers and serves to retard the interchange of water between the two aquifers.

The Burkeville has been mapped in this report as a rock-stratigraphic unit consisting predominantly of silt and clay. Boundaries were determined independently from time concepts although in some places the unit appears to possess approximately isochronous boundaries. In most places, however, this is not the case. For example, the entire thickness of sediment in the Burkeville confining system in some areas is younger than the entire thickness of sediment in the Burkeville in other places.

The configuration of the unit is highly irregular. Boundaries are not restricted to a single stratigraphic unit but transgress the Fleming-Oakville contact in many places. This is shown on sections D-D' to G-G' and J-J' (Figures 5-8 and 11). Where the Oakville Sandstone is present, the Burkeville crops out in the Fleming but dips gradually into the Oakville because of facies changes from sand to clay downdip.

The typical thickness of the Burkeville ranges from about 300 to 500 feet (91 to 152 m). However, thick sections of predominantly clay in Jackson and Calhoun Counties account for the Burkeville's gradual increase to its maximum thickness of more than 2,000 feet (610 m) as shown on section F-F' (Figure 7).

The Burkeville confining system should not be construed as a rock unit that is composed entirely of silt and clay. This is not typical of the unit, although examples of a predominance of silt and clay can be seen in some logs in sections H-H' and I-I' (Figures 9-10). In most places, the Burkeville is composed of many individual sand layers, which contain fresh to slightly saline water; but because of its relatively large percentage of silt and clay when compared to the underlying Jasper aquifer and overlying Evangeline, the Burkeville functions as a confining unit.

Evangeline Aquifer

The Evangeline aquifer, which was named and defined by Jones (Jones, Turcan, and Skibitzke, 1954) for a ground-water reservoir in southwestern Louisiana, has been mapped also in Texas, but heretofore has been delineated no farther west than Washington, Austin, Fort Bend, and Brazoria Counties. Its presence as an aquifer and its hydrologic boundaries to the west have been a matter of speculation. D. G. Jorgensen, W. R. Meyer, and W. H. Sandeen of the U.S. Geological Survey (written commun., March 1, 1976) recently refined the delineation of the aquifer in previously mapped areas and continued its delineation to the Rio Grande. The boundaries of the Evangeline as they appear on the sections in this report are their determinations.

The Evangeline aquifer has been delineated in this report essentially as a rock-stratigraphic unit. Although the aquifer is composed of at least the Goliad Sand, the lower boundary transgresses time lines to include sections of sand in the Fleming Formation. The base of the Goliad Sand at the outcrop coincides with the base of the Evangeline only in South Texas as shown in sections H-H' to K-K' (Figures 9-12). Elsewhere, the Evangeline at the surface includes about half of the Fleming outcrop. The upper boundary of the Evangeline probably follows closely the top of the Goliad Sand where present, although this relationship is somewhat speculative.

The Evangeline aquifer is typically wedge shaped and has a high sand-clay ratio. Individual sand beds are characteristically tens of feet thick. Near the outcrop, the aquifer ranges in thickness from 400 to 1,000 feet (122 to 305 m), but near the coastline, where the top of the aquifer is about 1,000 feet (305 m) deep, its thickness averages about 2,000 feet (610 m). The Evangeline is noted for its abundance of good quality ground water and is considered one of the most prolific aquifers in the Texas Coastal Plain. Fresh to slightly saline water in the aquifer, however, is shown to extend to the coastline only in section J-J' (Figure 11).

Chicot Aquifer

The Chicot aquifer, which was named and defined by Jones (Jones, Turcan, and Skibitzke, 1954) for a ground-water reservoir in southwestern Louisiana, is the youngest aquifer in the Coastal Plain of Texas. Over the years, the aquifer gradually was mapped westward from Louisiana into Texas where, heretofore, its most

APPENDIX A

STREAMBED SEDIMENT LABORATORY REPORTS

Aqua-Tech Laboratories, Inc.

WATER AND WASTEWATER TESTING
P.O. BOX 1036
HEARNE, TEXAS 77859

December 31, 1986

CLIENT: Hussmann Old Brazos Forge
ADDRESS: P. O. Box 322, Brenham, TX 77833
SAMPLE DATE: 12-12-86
SAMPLE POINT: Sites 1, 2, 3, 4, 5, 6, 8 as indicated by TWC map.
SAMPLED BY: Doug Wallace
SAMPLE TYPE: Soil

	EP METALS			TOTAL METALS						
SAMPLE	Cr ppm	Cd ppm	Pb ppm	Cr ppm	Cd ppm	Pb ppm	Ni ppm	Zn ppm	Cu ppm
Site 1	<0.05	<0.005	<0.05	78	0.4	15	519	110	44
Site 2	<0.05	<0.005	<0.05	139	0.3	18	320	95	62
Site 3	<0.05	<0.005	<0.05	71	0.4	11	127	47	34
Site 4	<0.05	<0.005	<0.05	45	0.4	15	161	27	22
Site 5	<0.05	<0.005	<0.05	469	0.3	12	700	49	92
Site 6	<0.05	<0.005	<0.05	2540	0.5	30	5110	84	268
Site 8	<0.05	<0.005	<0.05	67	0.7	20	484	390	60

I certify that the presented analytical results were obtained under my direction using the methods of testing and procedure in accordance with applicable existing EPA/TWC regulations. I also certify that this is a true and correct analyses of the samples collected by this laboratory, within an acceptable confidence interval.

John Brien

John Brien, Director

Aqua-Tech Laboratories, Inc.

WATER AND WASTEWATER TESTING
P.O. BOX 1036
HEARNE, TEXAS 77859

November 11, 1987

Client: Hussmann-Brazos Forge
Address: P.O. Box 322
Brenham, TX 77833
Date Sampled: 7-23-87
Sampled by: June Brien
Type: Soil
Site: Creek Bed

SITE	TIME	TOTAL (ppm) Nickel	Copper	Chromium	Zinc
BG	11:30 am	17	8	16	30
1	11:20 am	965	55	100	138
2	11:15 am	276	27	2.94	37
3	11:10 am	420	39	565	32
4	11:00 am	278	24	112	29
5	10:55 am	12,000	960	5740	380
6	10:50 am	540	30	166	43
*7y	10:25 am	1,100	31	45	280
7	10:25 am	810	32	61	220
7 dulp	10:25 am	950	70	55	230

		EP TOX (ppm) Nickel	Copper	Chromium	Zinc
7	10:25 am	13.6	_0.08	0.05	1.7

* 7y included mostly yellow colored soil from site 7.

June M. Brien
June M. Brien, Director

Aqua-Tech

Laboratories, Inc.

WATER AND WASTEWATER TESTING
P.O. BOX 1036
HEARNE, TEXAS 77859

March 3, 1988

CLIENT: HUSSMAN OLD BRAZOS FORGE
ADDRESS: P. O. Box 322
SAMPLE DATE: 12-15-87
SAMPLE POINT: Soil from Creek
SAMPLED BY: JMB & DT
SAMPLE TYPE: Grab

		TOTAL (ppm)			
SITE	TIME	Nickel	Copper	Chromium	Zinc
BG	11:50 AM	15	7	19	50
1	11:40 AM	920	146	255	520
2	11:37 AM	900	34	298	47
3	11:35 AM	1210	44	480	52
4	11:32 AM	590	76	940	46
5	11:30 AM	153	8	63	19
6	11:25 AM	570	43	169	68
7	11:45 AM	184	41	179	410
	EPA METHOD #	249.1	220.1	218.1	289.1

		EP Toxicity (ppm)			
SITE	TIME	Nickel	Copper	Chromium	Zinc
7	11:45 AM	6.00	0.14	0.14	1.05

John Brien

John Brien, Director

RECEIVED FEB 27 1989

Aqua-Tech
Laboratories, Inc.
WATER AND WASTEWATER TESTING
P.O. BOX 1036
HEARNE, TEXAS 77859

February 21, 1989

CLIENT: HUSSMAN OLD BRAZOS FORGE
ADDRESS: P. O. Box 322
SAMPLE DATE: 12-16-88
SAMPLE POINT: Soil from creek
SAMPLED BY: JMB & CR
SAMPLE TYPE Grab

TOTAL (ppm)

SITE	Nickel ppm	Copper ppm	Chromium ppm	Zinc ppm
BG	88	95 89 88	660 525 560	94
1	40	42	113	78
2	285	43	174	65
3	84	94 110	460 398	85 84
4	199 197	70	152	65
5	250	26	84	34
6	450	36 32	295	40
7	245	29 43	61 59	65
EPA METHOD #	249.1	220.1	218.1	289.1

EP Toxicity (ppm)

SITE	Chromium ppm
BG	<0.05
1	<0.05
2	<0.05
3	<0.05
4	<0.05
5	<0.05
6	<0.05
7	<0.05

John Brien

John Brien, D' ctor

RECEIVED MAR 2 3 1989

Aqua-Tech
Laboratories, Inc.

WATER AND WASTEWATER TESTING
P.O. BOX 1036
HEARNE, TEXAS 77859

March 21, 1989

CLIENT:	HUSSMAN OLD BRAZOS FORGE
ADDRESS:	P. O. Box 322
SAMPLE DATE:	3-9-89
SAMPLE POINT:	Old and New background sites from creek
SAMPLED BY:	Amy Yates (Aqua-Tech)
SAMPLE TYPE	Grab

TOTAL (ppm)

SITE	Nickel ppm		Copper ppm		Chromium ppm		Zinc ppm	
Old Background	26	24	8	9	27	29	39	39
New Background	555	545	65	65	313	325	52	53
EPA METHOD #	249.1		220.1		218.1		289.1	

John Brien

John Brien, Director

Table 1. Streambed Soil Total Chromium Concentrations, Former Old Brazos Forge Facility

		Soil Sample Location							
Sample Date	Sampled By	1	2	3	4	5	6	7	BG
* 1984	TNRCC	670	600	530	1,500	4,450	5,400	---	---
* 12/12/86	TNRCC	122 (0.024)	54 (0.008)	124 (0.026)	800 (0.048)	1,310 (0.05)	58,000 (0.064)	---	24 (0.008)
12/12/86	OBF	78 (<0.05)	139 (<0.05)	71 (<0.05)	45 (<0.05)	469 (<0.05)	2,540 (<0.05)	---	---
** 7/23/87	OBF/AT	100	2.94	565	112	5,740	166	45;61;55 (0.05)	16
** 12/15/87	OBF/AT	255	298	480	940	63	169	179 (0.14)	19
** 12/16/88	OBF/GM	113 (<0.05)	174 (<0.05)	460;398 (<0.05)	152 (<0.05)	84 (<0.05)	295 (<0.05)	61;59 (<0.05)	660;525;560 (<0.05)
3/9/89	OBF/AT	---	---	---	---	---	---		27;29;313;325
6/94	TNRCC	50.8	---	---	204	---	---	---	8.8

BG Background sample location

OBF Old Brazos Forge

AT Aquatech Laboratories, Inc.

GM Geraghty & Miller

* Sampled by TNRCC at following locations: 1 - northwest corner of OBF property in streambed, 2 - discharge point, 3 - halfway between discharge and Rt. 36, 4 - north side of Rt. 36 in right-of-way, 5 - south side of Rt. 36 in right-of-way, 6 - private property 80 yards east of Rt. 36

** Sampled at following locations: 1 - outfall, 2 - 50 yards downstream, 3 - 100 yards downstream, 4 - 150 yards downstream, 5 - 200 yards downstream, 6 - 250 yards downstream, BG - upstream of discharge

Results given in milligrams per kilogram, EP Toxicity results in parenthesis

Note: 12/86 - Sample locations assumed same as 1984
7/87 - TNRCC split; results unknown
12/88 - TNRCC split locations, 1, 5, 6, BG; results unknown
3/89 - Sampled at original background and new background locations
Location 7 not known

Table 2. Streambed Soil Total Copper Concentrations, Former Old Brazos Forge Facility

		Soil Sample Location							
Sample Date	Sampled By	1	2	3	4	5	6	7	BG
* 1984	TNRCC	710	540	328	1,000	3,050	6,000	---	---
* 12/12/86	TNRCC	48	5	32	144	507	58	---	<0.1
12/12/86	OBF	44	62	34	22	92	268	---	---
** 7/23/87	OBF/AT	55	27	39	24	960	30	31;32;70	8
** 12/15/87	OBF/AT	146	34	44	76	8	43	41	7
** 12/16/88	OBF/GM	42	43	94;110	70	26	36;32	29;43	95;89;88
3/9/89	OBF/AT	---	---	---	---	---	---	---	8;9;65;65
6/94	TNRCC	8.3	---	---	15.6	---	---	---	4.4

BG Background sample location
OBF Old Brazos Forge
AT Aquatech Laboratories, Inc.
GM Geraghty & Miller
* Sampled by TNRCC at following locations: 1 - northwest corner of OBF property in streambed, 2 - discharge point, 3 - halfway between discharge and Rt. 36, 4 - north side of Rt. 36 in right-of-way, 5 - south side of Rt. 36 in right-of-way, 6 - private property 80 yards east of Rt. 36
** Sampled at following locations: 1 - outfall, 2 - 50 yards downstream, 3 - 100 yards downstream, 4 - 150 yards downstream, 5 - 200 yards downstream, 6 - 250 yards downstream, BG - upstream of discharge

Results given in milligrams per kilogram

Note: 12/86 - Sample locations assumed same as 1984
7/87 - TNRCC split; results unknown
12/88 - TNRCC split locations, 1, 5, 6, BG; results unknown
3/89 - Sampled at original background and new background locations
Location 7 not known

Table 3. Streambed Soil Total Nickel Concentrations, Former Old Brazos Forge Facility

		Soil Sample Location							
Sample Date	Sampled By	1	2	3	4	5	6	7	BG
* 1984	TNRCC	970	1,430	2,120	7,000	24,050	34,000	---	---
* 12/12/86	TNRCC	323	111	206	970	4,470	98	---	16
12/12/86	OBF	519	320	127	161	700	5,110	---	---
** 7/23/87	OBF/AT	965	276	420	278	12,000	540	1;100;810;950	17
** 12/15/87	OBF/AT	920	900	1,210	590	153	570	184	15
** 12/16/88	OBF/GM	40	285	84	199;197	250	450	245	88
3/9/89	OBF/AT	---	---	---	---	---	---	---	26;24;555;545
6/94	TNRCC	103	---	---	61.3	---	---	---	6.6

BG Background sample location
OBF Old Brazos Forge
AT Aquatech Laboratories, Inc.
GM Geraghty & Miller
* Sampled by TNRCC at following locations: 1 - northwest corner of OBF property in streambed, 2 - discharge point,. 3 - halfway between discharge and Rt. 36, 4 - north side of Rt. 36 in right-of-way, 5 - south side of Rt. 36 in right-of-way, 6 - private property 80 yards east of Rt. 36
** Sampled at following locations: 1 - outfall, 2 - 50 yards downstream, 3 - 100 yards downstream, 4 - 150 yards downstream, 5 - 200 yards downstream, 6 - 250 yards downstream, BG - upstream of discharge

Results given in milligrams per kilogram

Note: 12/86 - Sample locations assumed same as 1984
7/87 - TNRCC split; results unknown
12/88 - TNRCC split locations, 1, 5, 6, BG; results unknown
3/89 - Sampled at original background and new background locations
Location 7 not known

Table 4. Streambed Soil Total Zinc Concentrations, Former Old Brazos Forge Facility

Sample Date	Samples By	Soil Sample Location 1	2	3	4	5	6	7	BG
* 1984	TNRCC	560	520	486	740	1,100	3,000	---	---
* 12/12/86	TNRCC	107	39	28	67	145	419	---	32
12/12/86	OBF	110	95	47	27	49	84	---	---
** 7/23/87	OBF/AT	138	37	32	29	380	43	280;220;230	30
** 12/15/87	OBF/AT	520	47	52	46	19	68	410	50
** 12/16/88	OBF/GM	78	65	85;84	65	34	40	65	94
3/9/89	OBF/AT	---	---	---	---	---	---	---	39;39;52;53
6/94	TNRCC	26.1	---	---	21.3	---	---	---	21.3

BG Background sample location
OBF Old Brazos Forge
AT Aquatech Laboratories, Inc.
GM Geraghty & Miller
* Sampled by TNRCC at following locations: 1 - northwest corner of OBF property in streambed, 2 - discharge point, 3 - halfway between discharge and Rt. 36, 4 - north side of Rt. 36 in right-of-way, 5 - south side of Rt. 36 in right-of-way, 6 - private property 80 yards east of Rt. 36
** Sampled at following locations: 1 - outfall, 2 - 50 yards downstream, 3 - 100 yards downstream, 4 - 150 yards downstream, 5 - 200 yards downstream, 6 - 250 yards downstream, BG - upstream of discharge

Results given in milligrams per kilogram

Note: 12/86 - Sample locations assumed same as 1984
7/87 - TNRCC split; results unknown
12/88 - TNRCC split locations, 1, 5, 6, BG; results unknown
3/89 - Sampled at original background and new background locations
Location 7 not known

Table 5. Surface Water Quality

Sample ID	Ca	Cl	CO3	HCO3	K	Mg	Mn	Na	NO3	pH	SO4	TDS	Zn	Cu	Cr	Ni
Southwestern Laboratories																
US	86.0	54.4	0.0	180	1.42	3.89	(<0.05)	31.8	0.39	7.66	32.2	468	---	---	---	---
(Little Sandy	96.0	67.0	0.0	177	1.52	3.92	(<0.05)	36.3	0.16	7.68	26.0	496	---	---	---	---
Creek Upstream)	96.6	57.4	0.0	180	1.41	3.82	(<0.05)	30.9	0.26	7.69	31.8	410	---	---	---	---
	95.0	57.4	0.0	173	1.41	3.94	(<0.05)	31.1	0.34	7.74	32.6	464	---	---	---	---
MS	93.5	61.4	0.0	167	1.50	3.72	(<0.05)	31.6	0.31	7.95	29.7	398	---	---	---	---
(Little Sandy	100.0	61.4	0.0	180	1.49	3.81	0.52	31.0	0.39	7.77	19.7	430	---	---	---	---
Creek Midway Downstream)	94.1	59.4	0.0	185	1.38	3.79	0.07	30.8	0.14	7.80	27.9	526	---	---	---	---
	94.1	60.4	0.0	167	1.40	3.72	(<0.05)	31.0	0.14	7.99	28.4	376	---	---	---	---
DS	84.8	56.4	0.0	163	1.58	3.76	(<0.05)	30.2	0.29	7.92	27.0	454	---	---	---	---
(Little Sandy	90.0	57.4	0.0	143	1.61	3.67	(<0.05)	29.8	0.18	7.81	27.4	368	---	---	---	---
Creek Downstream)	87.0	54.4	0.0	179	1.52	3.87	0.05	29.8	0.29	7.80	26.3	414	---	---	---	---
	88.2	54.4	0.0	184	1.54	3.68	0.05	29.5	0.31	7.85	26.4	498	---	---	---	---
Aqua-Tech Laboratories																
US	99.8	57.4	0.0	260	1.44	2.6	0.05	34.8	1.56	7.5	26	524	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Little Sandy	97.8	55.9	0.0	290	1.31	2.7	0.13	31.2	0.87	7.3	24	580	(<0.05)	(<0.05)	(<0.05)	(<0.05)
Creek Upstream)	92.8	58.3	0.0	260	1.51	3.1	0.15	29.2	1.03	7.3	25	509	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	83.4	55.4	0.0	260	1.41	3.3	0.10	35.6	0.78	7.1	24	510	(<0.05)	(<0.05)	(<0.05)	(<0.05)
MS	67.6	61.7	0.0	220	0.92	2.9	(<0.05)	38.8	0.59	7.6	17	435	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Little Sandy	88.4	61.7	0.0	310	1.13	2.4	(<0.05)	33.6	1.21	7.1	19	476	(<0.05)	(<0.05)	(<0.05)	(<0.05)
Creek Midway Downstream)	92.4	58.8	0.0	240	1.22	2.8	(<0.05)	32.8	0.38	7.3	22	474	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	69.8	62.2	0.0	250	0.87	2.4	(<0.05)	39.6	1.83	7.8	21	481	(<0.05)	(<0.05)	(<0.05)	(<0.05)
DS	62.2	58.3	0.0	154	1.11	2.4	0.06	29.2	17.12	7.2	21	506	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Little Sandy	96.6	55.4	0.0	290	1.38	2.7	0.17	32.0	0.47	7.4	21	543	(<0.05)	(<0.05)	(<0.05)	(<0.05)
Creek Downstream)	82.2	53.4	0.0	270	1.21	2.9	0.13	29.6	0.46	7.3	21	521	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	63.6	58.3	0.0	280	1.12	2.7	0.10	28.8	0.36	7.6	24	449	(<0.05)	(<0.05)	(<0.05)	(<0.05)

--- Not analyzed

Note: Results in milligrams per liter except pH.

TABLE 6. WATER LEVEL MEASUREMENTS - JANUARY 26, 1995

WELL	GROUND ELEV. (FT. MSL)	MP ELEV. (FT. MSL)	DEPTH TO WATER (FT.)	GW ELEV. (FT. MSL)	COMPLETION ZONE
MH-2	328.82	332.62	21.45	311.17	SH
MH-3	330.12	333.42	25.60	307.82	SH
MH-5	343.01	343.01	34.68	308.33	SH
MH-6	326.37	329.67	20.01	309.66	SH
MH-9	339.85	342.35	31.98	310.37	SH
MH-10	344.83	347.33	40.15	307.18	SH
MH-11	346.09	349.03	71.69	277.34	DP
MH-12	345.24	347.68	40.44	307.24	SH
MH-13	330.64	333.22	24.81	308.41	SH
MH-14	330.87	334.08	57.31	276.77	DP
MH-15	329.46	332.49	55.79	276.70	DP
MH-16	316.90	318.92	15.09	303.83	SH

MSL - mean sea level
MP - measuring point
GW - groundwater
SH - shallow sand
DP - deep sand

OBFWLJ25.XLS / 3/25/95

Table 7. Shallow Zone Groundwater Quality - Chromium

		WELL NUMBER							
SAMPLE DATE		MH-2	MH-3	MH-5	MH-6	MH-9	MH-10	MH-12	MH-13
07/21/82					< 0.01				
03/27/83		< 0.02	< 0.02	< 0.02	0.02				
05/06/83		< 0.02	< 0.02		< 0.02				
08/10/83		< 0.02	< 0.02		< 0.02				
07/10/84		0.03							
03/07/85		< 0.001	0.124	0.023	0.062	< 0.001			
04/17/85		< 0.05				< 0.05			
06/27/85			0.06	< 0.05	< 0.05				
07/02/85			0.05						
07/22/85		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
08/01/85									
09/27/85		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			
12/09/85		0.001	0.018	0.064	0.011	0.007			
03/10/86		< 0.001	0.009	0.025	0.004	0.004			
06/10/86		< 0.01	0.08	0.01	< 0.01	< 0.01			
12/29/86		< 0.05	0.15	< 0.05	< 0.05	< 0.05	< 0.05		
04/27/87							< 0.05		
06/30/87		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
09/28/87							< 0.05		
12/15/87		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
06/24/88		< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01		
08/03/88		< 0.01	0.03	0.03	< 0.01	0.02	< 0.01		
12/15/88		0.01	0.01	0.02	0.01	0.01	0.02		
06/30/89		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
09/25/89								< 0.05	< 0.05
12/20/89		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
03/06/90		< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03		
06/26/90		< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
11/26/90		< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03		
01/15/91		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
05/23/91		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
07/23/91		< 0.03	0.04	< 0.03	< 0.03	< 0.03	< 0.03		
11/19/91		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
07/27/92		< 0.03	0.05	< 0.03	< 0.03	< 0.03	< 0.03		
10/19/92		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
01/05/93	**			0.112				0.147	
01/05/93	*			0.06				0.08	
01/11/93		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
04/27/93		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
08/31/93		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
10/25/93		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
01/31/94		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
04/26/94		< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		

-CONCENTRATIONS IN MILLIGRAMS PER LITER
-NO VALUE INDICATES SAMPLE NOT COLLECTED
- < DENOTES LESS THAN
* TOTAL (UNFILTERED) ANALYSIS, SAMPLED BY AQUA-TECH LABORATORIES, INC.
** TNRCC SAMPLE RESULTS

CHROM.XLS3/25/95

Table 8. Shallow Zone Groundwater Quality - Copper

SAMPLE DATE	WELL NUMBER MH-2	MH-3	MH-5	MH-6	MH-9	MH-10	MH-12	MH-13
07/21/82				< 0.01				
03/27/83								
05/06/83								
08/10/83								
07/10/84								
03/07/85								
04/17/85								
06/27/85								
07/02/85								
07/22/85	< 0.03	0.26		0.04				
08/01/85								
09/27/85	< 0.03	0.06		< 0.03				
12/09/85	0.002	0.092		0.01				
03/10/86	< 0.01	0.06	0.04	0.01	0.01			
06/10/86	< 0.02	0.14	0.03	< 0.02	< 0.02			
12/29/86	< 0.05	0.07	0.05	< 0.05	< 0.05			
04/27/86								
06/30/87	< 0.05	0.06	< 0.05	< 0.05	< 0.05			
09/28/87								
12/15/87	< 0.05	0.1	< 0.05	< 0.05	< 0.05	< 0.05		
06/24/88	0.02	0.06	0.04	0.02	0.04	0.02		
08/03/88	0.02	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01		
12/15/88	0.04	0.03	0.04	0.01	0.03	0.02		
06/30/89	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
09/25/89							< 0.05	< 0.05
12/20/89	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02		
03/06/90	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
06/26/90	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
01/15/91	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
05/23/91	< 0.02	0.02	< 0.02	< 0.02	< 0.02	< 0.02		
07/23/91	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
11/19/91	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
07/27/92	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
10/19/92	< 0.05	0.08	< 0.05	< 0.05	< 0.05	< 0.05		
01/11/93	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
04/27/93	< 0.05	0.06	< 0.05	< 0.05	< 0.05	< 0.05		
08/31/93	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
10/25/93	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
01/31/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		
04/26/94	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05		

-CONCENTRATIONS IN MILLIGRAMS PER LITER
-NO VALUE INDICATES SAMPLE NOT COLLECTED
-< DENOTES LESS THAN

COPPER2.XLS 4/3/95

Table 9. Shallow Zone Groundwater Quality - Nickel

	WELL NUMBER							
SAMPLE DATE	MH-2	MH-3	MH-5	MH-6	MH-9	MH-10	MH-12	MH-13
07/21/82				0.01				
03/27/83								
05/06/83								
08/10/83								
07/10/83								
03/07/85								
04/17/85								
06/27/85								
07/02/85								
07/22/85	< 0.05	0.28		0.14				
08/01/85								
09/27/85	< 0.02	0.06		< 0.02				
12/09/85	0.017	0.56		0.068				
03/10/86	0.011	0.35	0.17	0.013	0.006			
06/10/86	< 0.04	50.9	0.49	0.24	< 0.04			
12/29/86	0.19	3.5	0.36	0.08	0.07			
04/27/86								
06/30/87	0.08	3.2	0.22	0.09	0.05			
09/28/87								
12/15/87	< 0.05	1.38	0.25	< 0.05	< 0.05	< 0.05		
06/24/88	0.05	0.7	0.77	0.61	0.52	0.23		
08/03/88	0.02	0.13	0.05	0.05	0.05	0.07		
12/15/88	0.03	0.28	< 0.01	0.01	0.02	0.04		
06/30/89	0.05	0.39	0.17	0.1	0.12	0.11		
09/25/89							< 0.05	< 0.05
12/20/89	< 0.05	0.23	< 0.05	< 0.05	< 0.05	< 0.05		
03/06/90	< 0.03	0.05	< 0.03	< 0.03	< 0.03	< 0.03		
06/26/90	0.05	0.15	0.04	< 0.03	0.03	< 0.03		
01/15/91	< 0.03	0.17	0.07	< 0.03	< 0.03	< 0.03		
05/23/91	< 0.03	0.21	0.1	< 0.03	< 0.03	< 0.03		
07/23/91	0.06	0.14	0.09	0.04	0.06	0.03		
11/19/91	0.03	0.17	0.1	0.05	< 0.02	0.02		
07/27/92	< 0.02	0.15	0.08	0.05	0.06	< 0.02		
10/19/92	< 0.05	0.13	< 0.05	< 0.05	< 0.05	< 0.05		
01/11/93	< 0.02	0.06	0.06	< 0.02	< 0.02	< 0.02		
04/27/93	< 0.02	0.06	0.05	< 0.02	< 0.02	< 0.02		
08/31/93	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
10/25/93	< 0.02	0.1	0.02	< 0.02	< 0.02	< 0.02		
01/31/94	< 0.02	0.11	0.04	< 0.02	< 0.02	0.03		
04/26/94	< 0.02	0.06	0.04	< 0.02	< 0.02	< 0.02		

-CONCENTRATIONS IN MILLIGRAMS PER LITER
-NO VALUE INDICATES SAMPLE NOT COLLECTED
-< DENOTES LESS THAN

NICK.XLS 3/29/95

Table 10. Shallow Zone Groundwater Quality - Zinc

				WELL NUMBER				
SAMPLE DATE	MH-2	MH-3	MH-5	MH-6	MH-9	MH-10	MH-12	MH-13
07/21/82				0.03				
03/27/83								
05/06/83								
08/10/83								
07/10/84								
03/07/85								
04/17/85								
06/27/85								
07/02/85								
07/22/85	0.02	18		0.82				
08/01/85								
09/27/85	0.01	2		0.03				
12/09/85	0.02	0.11		0.08				
03/10/86	0.03	0.68	0.05	0.03	0.05			
06/10/86	0.02	1.25	0.16	0.03	0.02			
12/29/86	0.07	0.46	0.09	< 0.05	0.06			
04/27/86								
06/30/87	0.05	0.31	0.07	0.05	0.05			
09/28/87								
12/15/87	< 0.05	0.45	0.17	0.06	< 0.05	< 0.05		
06/24/88	0.07	0.29	6.2	1.4	0.82	0.25		
08/03/88	0.03	0.06	0.05	0.04	0.04	0.07		
12/15/88	0.22	0.22	0.11	0.19	0.12	0.12		
06/30/89	0.08	0.38	0.09	0.08	0.11	< 0.05		
09/25/89							* 0.06	0.05
12/20/89	< 0.05	0.18	0.11	< 0.05	0.09	0.05		
03/06/90	0.06	0.13	0.06	0.06	0.03	0.05		
06/26/90	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03		
01/15/91	0.04	0.13	0.05	< 0.03	< 0.03	0.05		
05/23/91	0.06	0.1	0.09	0.31	0.07	0.08		
07/23/91	0.05	0.08	0.04	0.04	0.06	0.04		
11/19/91	0.03	0.05	0.06	0.07	0.06	0.19		
07/27/92	< 0.02	0.05	0.16	0.06	0.07	0.25		
10/19/92	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
01/11/93	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
04/27/93	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02		
08/31/93	0.04	0.11	0.08	0.03	0.03	0.07		
10/25/93	< 0.02	0.028	< 0.02	0.051	< 0.02	0.02		
01/31/94	0.03	0.07	< 0.02	0.03	< 0.02	< 0.02		
04/26/94	0.032	0.048	0.081	0.044	0.042	0.048		

-CONCENTRATIONS IN MILLIGRAMS PER LITER
-NO VALUE INDICATES SAMPLE NOT COLLECTED
-< DENOTES LESS THAN
* MAXIMUM CONCENTRATION OF FOUR REPLICATE SAMPLES (OTHERS NON-DETECT)

ZINC2.XLS 4/3/95

Table 11. Deep Sand Water Quality

Sample ID	Ca	Cl	CO3	HCO3	K	Mg	Mn	Na	NO3	pH	SO4	TDS	Zn	Cu	Cr	Ni
Southwestern Laboratories																
MH-15	88.1	40.3	0.0	204	2.62	2.97	(<0.05)	26.4	0.48	7.05	14.2	510	---	---	---	---
(Upgradient)	83.8	40.8	0.0	204	2.54	2.95	(<0.05)	26.4	0.45	7.07	14.2	416	---	---	---	---
	74.6	39.8	0.0	212	2.56	3.01	(<0.05)	26.5	0.43	7.09	14.2	452	---	---	---	---
	83.0	39.8	0.0	201	2.29	2.98	(<0.05)	26.1	0.41	7.07	14.2	432	---	---	---	---
MH-11	106.0	62.9	0.0	205	4.07	3.20	0.11	42.2	0.46	7.07	13.1	500	---	---	---	---
(Sidegradient)	78.3	62.9	0.0	183	3.72	3.11	0.11	43.4	0.45	7.10	12.8	478	---	---	---	---
	71.5	62.9	0.0	194	3.92	3.13	0.10	42.8	0.43	7.00	12.7	378	---	---	---	---
	76.0	62.9	0.0	195	3.68	3.18	0.09	42.3	0.21	7.06	12.5	480	---	---	---	---
MH-14	77.9	49.8	0.0	205	2.98	2.90	(<0.05)	30.8	0.80	7.04	17.1	468	---	---	---	---
(Downgradient)	83.5	49.3	0.0	195	2.49	2.90	(<0.05)	28.7	0.58	7.08	13.9	514	---	---	---	---
	76.6	50.3	0.0	185	2.14	2.92	(<0.05)	27.8	0.63	7.01	13.0	558	---	---	---	---
	87.2	49.8	0.0	193	2.17	2.91	(<0.05)	27.7	0.53	7.07	13.3	508	---	---	---	---
Aqua-Tech Laboratories																
MH-15	65.8	33.0	0.0	370	7.1	1.9	(<0.05)	37.5	0.59	6.6	21.0	486	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Upgradient)	62.6	33.5	0.0	370	7.1	2.2	(<0.05)	28.5	0.62	6.9	24.0	426	0.05	(<0.05)	(<0.05)	(<0.05)
	67.8	34.5	0.0	380	6.0	2.2	(<0.05)	26.7	0.59	6.6	24.0	496	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	69.0	33.5	0.0	450	5.3	2.6	(<0.05)	29.1	1.01	6.5	13.0	472	(<0.05)	(<0.05)	(<0.05)	(<0.05)
MH-11	77.8	52.5	0.0	13,450	5.0	2.0	0.18	51.0	0.29	7.0	20.0	29,074	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Sidegradient)	87.8	54.4	0.0	2,980	5.7	2.2	0.15	38.8	0.64	6.6	12.0	275	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	89.0	56.8	0.0	890	4.7	2.1	0.16	41.6	0.33	6.6	13.0	3,214	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	89.0	58.3	0.0	520	7.3	1.6	0.15	45.0	0.65	6.7	11.0	520	0.10	(<0.05)	(<0.05)	(<0.05)
MH-14	58.2	41.8	0.0	3,070	7.9	1.5	(<0.05)	38.4	2.08	6.8	42.0	587	(<0.05)	(<0.05)	(<0.05)	(<0.05)
(Downgradient)	71.4	51.0	0.0	640	7.0	1.8	(<0.05)	31.6	0.62	7.1	26.0	517	(<0.05)	(<0.05)	(<0.05)	(<0.05)
	78.6	51.0	0.0	910	6.9	2.0	(<0.05)	29.2	0.56	6.4	26.0	561	(<0.05)	(<0.05)	(<0.05)	0.06
	81.4	51.5	0.0	590	6.4	2.0	(<0.05)	32.0	1.99	6.5	22.0	255	(<0.05)	(<0.05)	(<0.05)	0.05

--- Not analyzed

Note: Results in milligrams per liter except pH.

Table 12. Groundwater Analytical Methods, Containers, and Preservatives. Former Old Brazos Forge Facility.

Parameter	Analytical Method	Sample Container	Preservative	Holding Time
Chromium	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Copper	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Nickel	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Zinc	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Carbonate	2320B [c] or 310 [b]	1 liter/plastic or glass	Cool 4 degree Celsius	14 days
Bicarbonate	2320B [c] or 310 [b]	1 liter/plastic or glass	Cool 4 degree Celsius	14 days
Calcium	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Chloride	300.0, 325.2 [b] or 9252 [a]	1 liter/plastic or glass	Cool 4 degree Celsius	28 days
Iron	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Magnesium	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Manganese	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Sodium	200.7 [b] or 6010 [a]	1 liter/plastic or glass	Field Filter (0.45 micron), HNO3 to pH <2	180 days
Sulfate	300.0 [b] or 9038 [a]	1 liter/plastic or glass	Cool 4 degree Celsius	28 days
pH	150.1 [b] or 9040 [a]	1 liter/plastic or glass	Cool 4 degree Celsius	analyze immediately
TDS	160.1 [b]	1 liter/plastic or glass	Cool 4 degree Celsius	7 days

[a] "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", USEPA, SW-846, 3rd Edition, November 1990.
[b] "Methods for Chemical Analysis of Water and Wastes", USEPA, EPA 600/4-79-020, Revised March 1983.
[c] "Standard Mehtods for the Examination of Water and Wastewater", APHA - AWWA - WPLF, 17th Edition, 1989 and 1991 Supplement.

Report 295

Hydrology of the Jasper Aquifer in the Southeast Texas Coastal Plain

October 1986

THE STATE OF TEXAS

Texas Water Development Board

TEXAS WATER DEVELOPMENT BOARD

REPORT 295

HYDROLOGY OF THE JASPER AQUIFER IN THE SOUTHEAST TEXAS COASTAL PLAIN

By

E. T. Baker, Jr.
U.S. Geological Survey

This report was prepared by the U.S. Geological Survey under cooperative agreement with the Texas Water Development Board

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thick at the coastline in southeast Texas. This wedge of clastic sediment rapidly thins inland from the coastline to extinction along an irregular line from 70 to 100 miles inland from the coastline.

The Goliad Sand of Pliocene age; Willis Sand, Bentley Formation, Montgomery Formation, and Beaumont Clay of Pleistocene age; and alluvium of Holocene age comprise the post-Miocene sediments. All of these units are similar in lithology, and for this reason, delineation using electrical logs has not been attempted on the stratigraphic and hydrologic sections. Notwithstanding the difficulty in identifying these stratigraphic units individually in the subsurface, as a group they constitute significant aquifers in the southeast Texas Coastal Plain.

Hydrologic Units

The following discussion will emphasize five hydrologic units—the Catahoula confining system (restricted), which underlies the Jasper aquifer; the Jasper aquifer; and the Burkeville confining system and the Evangeline and Chicot aquifers, which overlie the Jasper. The hydrology of the units underlying and overlying the Jasper is important for understanding the water flow system in the Jasper and for modeling the aquifer.

Catahoula Confining System (Restricted)

The Catahoula confining system (restricted), which was named by Baker (1979) after the Catahoula Sandstone, is treated in this report as a quasi-hydrologic unit. In most of southeast Texas, this confining system has different boundaries than the stratigraphic Catahoula. Its top (base of the Jasper aquifer) is delineated along lithologic boundaries that are time-stratigraphic in some places, but transgress time lines in other places. Its base, which coincides with the base of the stratigraphic unit, is delineated everywhere in the report area along time-stratigaphic boundaries that are independent of lithology. No attempt was made to establish a lithologic (hydrologic) base for the unit, which would have created a distinct hydrologic unit. Such an effect would have involved a thorough hydrologic evaluation of pre-Miocene formations, which was beyond the scope of this study.

In some places, the Catahoula confining system (restricted) is identical to the stratigraphic unit, but there are notable exceptions. These departures of the hydrologic boundaries from the stratigraphic boundaries are most prominent in the eastern part of the study area near the Sabine River (Figure 7) and in numerous places at the outcrop and in the shallow subsurface (Figures 3-6). In these places, the very sandy parts of the Catahoula Sandstone (stratigraphic unit) that lie immediately below the Oakville Sandstone or Fleming Formation are included in the overlying Jasper aquifer. This leaves a lower section from 0 to 2,000 feet or more in thickness that consists predominantly of clay or tuff with some interbedded sand to compose the Catahoula confining system (restricted). In most places, this delineation creates a unit that generally is deficient in sand so as to preclude its classification in these areas as an aquifer. For this reason, in most of its shallow to moderately deep subsurface extent, the Catahoula confining system (restricted) functions hydrologically as a confining layer that greatly restricts interchange of water between the overlying Jasper aquifer and the underlying aquifers.

The quantity of clay and other fine-grained clastic material in the Catahoula confining system (restricted) generally increases downdip, until the Anahuac Formation is encountered at depths of 2,800 to 3,600 feet below sea level. Below this level, the "Frio" Formation becomes characteristically sandy and contains moderately saline water to brine (3,000 to more than 35,000 mg/l of dissolved solids) that extends to depths of many thousands of feet.

Jasper Aquifer

The Jasper aquifer, which was named by Wesselman (1967) for the town of Jasper in Jasper County, Texas, until recently had not been delineated farther west than Washington, Austin, and Fort Bend Counties in southeast Texas. Recently, delineations of the Jasper, as well as other related hydrogeologic units, were made by Baker (1979) across the Coastal Plain of Texas from the Sabine River to the Rio Grande.

The configuration of the Jasper aquifer in the subsurface, as shown in the sections, is geometrically irregular because the delineation was made on the basis of the aquifer being a rock-stratigraphic unit. The hydrologic boundaries were defined from observable physical (lithologic) features rather than from inferred geologic time lines, which do not necessarily correspond to lithologic features.

The position of the base and top of the Jasper aquifer in southeast Texas transgresses stratigraphic boundaries along strike and downdip. The base of the aquifer coincides with the stratigraphic lower boundary of the Oakville Sandstone or Fleming Formation in some places. In other places, the base of the Jasper lies within the Catahoula Sandstone or coincides with the base of that unit. The top of the aquifer is within the Fleming in places and is within the Oakville in other places. The dip of the top of the Jasper is fairly uniform in rate within the zone of fresh to slightly saline water. Within this zone, which is about 50 to 75 miles in width, the dip averages about 55 ft/mi to the south-southeast (Figure 8).

The Jasper aquifer ranges in thickness, where it is not eroded, from as little as 200 feet to about 3,200 feet within the area of its delineation. The maximum thickness occurs in the region where the aquifer contains moderately saline water to brine. An average range in thickness of the aquifer within the zone of water having concentrations of less than 3,000 mg/l of dissolved solids is from about 1,000 to 1,500 feet. At the Sabine River, the Jasper attains a thickness of 2,400 feet in well 12 in section E-E' (Figure 7), where the aquifer is composed predominantly of sand. This predominance of sand in the Jasper in the eastern part of the study area, however, diminishes in a westward direction.

The Jasper aquifer contains water having concentrations of less than 3,000 mg/l of dissolved solids from its outcrop to about 50 to 75 miles downdip from its outcrop. This downdip limit approximately parallels the coastline passing a few miles north of Beaumont and near the center of Houston. Water having concentrations of less than 3,000 mg/l of dissolved solids occurs in the Jasper as deep as 3,000 feet below sea level in section D-D' (Figure 6). Although pumpage from the Jasper is not significant, it is capable of yielding 3,000 gal/min or more of water to wells in certain areas.

Burkeville Confining System

The Burkeville confining system was named by Wesselman (1967) for outcrops near the town of Burkeville in Newton County, Texas. It separates the Jasper and Evangeline aquifers and retards the interchange of water between the two aquifers.

The Burkeville confining system is a rock-stratigraphic unit predominantly consisting of silt and clay. Upper and lower boundaries of the unit do not strictly correspond to geologic time boundaries, although in some places the unit appears to possess approximately isochronous boundaries. The configuration of the top and bottom of the unit is irregular. Boundaries are not restricted to a single stratigraphic unit but are included within the Fleming Formation and Oakville Sandstone in some places. This is shown in section D-D' (Figure 6).

The thickness of the Burkeville confining system ranges from about 100 to 1,000 feet. In general, the greatest variations occur in the relatively deep subsurface within the zone of moderately saline water to brine. A typical thickness of the Burkeville is about 300 feet.

The Burkeville confining system is predominantly composed of fine-grained materials, such as silt and clay, as shown in numerous geophysical logs. In most places, these fine-grained sediments are interbedded with sand lenses, which contain fresh to slightly saline water. Some of these sand lenses yield water to small-capacity wells. Because of its relatively large percentage of silt and clay when compared to the underlying Jasper aquifer and overlying Evangeline aquifer, the Burkeville is a confining unit. The effectiveness of the unit as a confining layer is further borne out by the fact that hydro-static pressures in the Jasper and Evangeline are notably different immediately above and below the Burkeville where detailed testing by well drillers has been done.

Evangeline and Chicot Aquifers

The Evangeline and Chicot aquifers were named and defined by Jones (Jones, Turcan, and Skibitzke, 1954) for ground-water reservoirs in southwestern Louisiana. They also have been mapped in Texas, but until recently, had not been delineated farther west than Washington, Austin, and Fort Bend Counties in southeast Texas. Their positions in the Coastal Plain of Texas westward to the Rio Grande are now known from mapping by D. G. Jorgensen, W. R. Meyer, and W. H. Sandeen of the U.S. Geological Survey (Baker, 1979).

The Evangeline aquifer primarily has been delineated as a rock-stratigraphic unit. Although the aquifer is composed of at least Pliocene-age sediments, its lower boundary crosses time lines to include sections of sand in the Fleming Formation. Within most of the study area, the Evangeline at the surface includes about the upper one-third of the Fleming outcrop as seen in sections A-A', B-B', and C-C' (Figures 3-5). In the western part of the area where the Oakville Sandstone is recognized, the Evangeline includes more than three-fourths of the Fleming outcrop as seen in section D-D' (Figure 6). The upper boundary of the aquifer probably closely follows the top of the Pliocene-age sediments or the Goliad Sand, which is not exposed, except perhaps in a few isolated places, in the report area. This stratigraphic relationship of the top of the Evangeline is somewhat speculative.

The Chicot aquifer has been defined to exclusively include the Quaternary age sediments. Its delineation in the subsurface on this stratigraphic basis is problematical due to the difficulty in identifying the base of the Quaternary deposits on electrical logs. This subsurface delineation in southeast Texas has been based largely on the presence of a greater sand-to-clay ratio in the Chicot than in the underlying Evangeline aquifer. In some places, a prominent clay layer has been used as the boundary. Differences in hydraulic conductivity or water levels in some areas also

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Report 162

GROUND-WATER RESOURCES OF WASHINGTON COUNTY, TEXAS

November 1972

TEXAS WATER DEVELOPMENT BOARD

REPORT 162

GROUND-WATER RESOURCES OF WASHINGTON COUNTY, TEXAS

By

W. M. Sandeen
United States Geological Survey

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8. Areas of recharge and discharge were delineated.

9. Aquifer tests were made to determine the hydraulic characteristics of the water-bearing sands (Table 3).

10. The hydrologic data were analyzed to determine the quantity and quality of ground water available for development.

11. Maps, charts, and graphs were prepared to correlate and illustrate the geologic and hydrologic data.

Previous Investigations

Taylor (1907) was the first to mention the presence of water wells in Washington County. Follett (1942) discussed briefly the geology and hydrology of a part of Washington County and in an additional study (1943) inventoried 245 wells.

Sundstrom, Hastings, and Broadhurst (1948, p. 275-276) published basic data on the public water supply of Brenham. Cronin and others (1963) made a reconnaissance study of ground water in the Brazos River basin which includes most of Washington County. Cronin and Wilson (1967) studied the water-bearing characteristics of the flood-plain alluvium along the Brazos River, including a part of Washington County.

Recent detailed investigations of ground-water resources of adjacent counties include: Lee County (Thompson, 1966); Fayette County (Rogers, 1967); and Austin and Waller Counties (Wilson, 1967).

Economic Development

From colonial times until about 1968, agriculture was the mainstay of the Washington County economy. At first corn, peas, and tobacco were grown. Later, as small holdings evolved into ranches and plantations, forage sorghums, oats, and cotton became important crops.

By 1968, the value of goods manufactured in Washington County exceeded farm income and the number of farms in operation continued to decline. In that year approximately three-fourths of all farm income came from livestock, predominately beef and dairy cattle; although hogs and poultry provided other important sources of revenue.

Through 1968, oil wells in Washington County had produced approximately 11,400,000 barrels of oil, most of which came from the Clay Creek and Brenham Fields.

The use of water for recreation is becoming increasingly important. Since 1967, Somerville Reservoir has attracted considerable attention for fishing, swimming, and boating. The reservoir stores 160,100 acre-feet of water and inundates about 11,460 acres in Washington, Lee, and Burleson Counties.

In 1960, the population of Washington County was 19,145. Brenham, which had a population of 7,740, is the county seat. Other communities include Burton, Chappell Hill, Gay Hill, Independence, and Washington.

Physiography, Drainage, and Climate

The land surface in Washington County is rolling to gently rolling. Locally along the Brazos River, nearly flat areas are as much as 4 miles wide. Altitudes range from about 150 feet above sea level in the extreme southeastern corner of the county to about 560 feet west of Burton.

In the southern and northeastern parts of the county, the drainage is primarily east and southeast to the Brazos River. In the northwestern part, the drainage is primarily northwest to Somerville Reservoir and Yegua Creek. The drainage is a prominent cuesta formed by the outcrop of the Oakville Sandstone.

Stream-gaging stations are maintained by the U.S. Geological Survey at five localities in Washington County (Figure 19). The station name, drainage areas, and periods of record are given in the following table (U.S. Geological Survey, 1968).

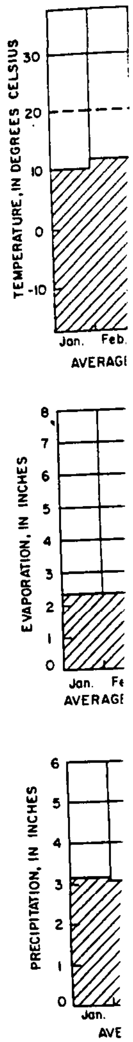
GAGING STATION	DRAINAGE AREA (SQ. MI.)	PERIOD OF RECORD
Yegua Creek near Somerville	1,008	1924-68
Brazos River at Washington	39,740	1965-68
New Year Creek near Chappell Hill 1/	167	1948, 1964-68
Brazos River near Hempstead	42,640	1938-68
Winkleman Creek near Brenham 1/	0.75	1966-68

1/ Partial-record station.

Washington County has a warm semihumid climate. Precipitation averages about 39 inches annually (Figures 2 and 3). The average annual gross lake-surface evaporation for the period 1940-65 was 54.6 inches (Kane, 1967).

The average annual temperature at Brenham (Figure 2) is about 68°F (20°C). Temperatures below freezing occur occasionally in the winter; temperatures above 100°F (38°C) are rare. The approximate dates of the first and last freezes are December 2 and

February 25, growing seasc



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Salinity of water.—Modified from a general classification of water based on dissolved-solids content by Winslow and Kister (1956, p. 5): Fresh water, less than 1,000 mg/l (milligrams per liter); slightly saline water, 1,000 to 3,000 mg/l; moderately saline water, 3,000 to 10,000 mg/l; very saline water, 10,000 to 35,000 mg/l; and brine, more than 35,000 mg/l.

Specific capacity.—The rate of yield of a well per unit of drawdown, usually expressed as gallons per minute per foot of drawdown. If the yield is 250 gpm and the drawdown is 10 feet, the specific capacity is 25 gpm/ft.

Specific yield.—The quantity of water that an aquifer will yield by gravity if it is first saturated and then allowed to drain; the ratio expressed in percentage of the volume of water drained to volume of the aquifer that is drained.

Storage coefficient.—The volume of water that an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in the component of head normal to that surface. Storage coefficients of artesian aquifers may range from about 0.00001 to 0.001; those of water-table aquifers may range from about 0.05 to 0.30.

Transmissibility.—The rate of flow of water in gallons per day through a vertical strip of the aquifer 1 foot wide extending through the vertical thickness of the aquifer at a hydraulic gradient of 1 foot per foot and at the prevailing temperature of the water. The transmissibility from a pumping test is reported for the part of the aquifer tapped by the well.

Transmission capacity of an aquifer.—The quantity of water that can be transmitted through a given width of an aquifer at a given hydraulic gradient, usually expressed in acre-feet per year or million gallons per day.

Water-table aquifer (unconfined aquifer).—An aquifer in which the water is unconfined; the upper surface of the zone of saturation is under atmospheric pressure only and the water is free to rise or fall in response to the changes in the volume of water in storage. A well penetrating an aquifer under water-table conditions becomes filled with water to the level of the water table.

Yield of a well.—The rate of discharge, commonly expressed as gallons per minute, gallons per hour, or gallons per day. In this report, yields are classified as: Small, less than 50 gpm (gallons per minute); moderate, 50 to 500 gpm; and large, more than 500 gpm.

GEOLOGIC AND HYDROLOGIC UNITS AND THEIR WATER-BEARING PROPERTIES

General Stratigraphy and Structure

Geological units relating to the occurrence of fresh and slightly saline ground water in Washington County range in age from Eocene to Holocene. The thicknesses, lithologic characteristics, age, and water-bearing properties of the formations and their correlation with hydrologic units are given in Table 2. The outcrops are shown on Figure 5. The units consist of about 6,000 feet of alternating beds of sand, silt, and clay or shale. Lesser amounts of limestone, tuff, lignite, gravel, gypsum, and volcanic ash are found.

All formations except the alluvial deposits crop out in belts that trend generally northeast-southwest and dip to the southeast (Figure 5). Dips increase with depth, creating wedge-shaped units that thicken Gulfward. For example, the top of the Sparta Sand dips at a rate of about 200 feet per mile; beds at the base of the Evangeline aquifer dip about 40 feet per mile. Faults are common, but they probably have little effect on the occurrence and movement of ground water.

The salt domes that underlie the Clay Creek and Brenham oilfields (Figure 19) disrupt the regional stratigraphy and structure and bring salt, anhydrite, gypsum, and limestone beds in contact with many of the water-bearing units. The quality of the ground water in the vicinity of the domes is probably affected by circulation through these disrupted beds.

More detailed discussions of the geology of Washington County are included in the publications of Deussen (1914 and 1924); Sellards, Adkins, and Plummer (1932); Doering (1935); Ellisor (1944); the Houston Geological Society (1954); Bernard and LeBlanc (1965); and Thompson (1966).

The units that yield fresh to slightly saline water to wells in Washington County are, from oldest to youngest: The Jackson Group of Eocene age; the Catahoula Sandstone, Jasper aquifer, and Burkeville aquiclude of Miocene age; the Evangeline aquifer of Miocene and Pliocene age; and the alluvium of the Brazos River of Pleistocene and Holocene age. The Carrizo Sand, Queen City Sand, and Sparta Sand of the Claiborne Group would probably yield small to moderate amounts of slightly saline water in northwestern Washington County (Thompson, 1966, Figure 7; and Rogers, 1967, Figure 6). The other units in the geologic section (Table 2) are not known to yield water to wells in Washington County. The stratigraphic correlations of the units are shown in Figures 20 and 21.

Claiborne Group

The formations in the Claiborne Group are the oldest units that are hydrologically significant in relation to the occurrence of fresh to slightly saline water in Washington County. The group is not exposed in Washington County, but crops out in the adjacent counties to the north.

Carrizo Sand

The Carrizo Sand is a continental sequence of predominately sand and some shale that unconformably overlies the Wilcox Group (Eocene). The formation ranges from 170 to 465 feet in thickness in Lee County (Thompson, 1966, p. 20). Thickness in Washington County was not determined. At the surface, the Carrizo is a highly permeable, fine- to medium-grained, well

Table 2.—Physical Characteristics and Water-Bearing Properties of the Hydrologic Units

SYSTEM	SERIES		GEOLOGIC UNIT	HYDROLOGIC UNIT	MAXIMUM THICKNESS (FT)	GENERAL COMPOSITION	WATER-BEARING PROPERTIES AND DISTRIBUTION OF SUPPLY
Quaternary	Holocene Pleistocene		Alluvium	Alluvium of the Brazos River	75	Red-brown to brown clay and silt; commonly overlying lighter-colored fine to coarse sand and gravel. Present beneath the flood plain of the Brazos River; in places forms isolated terraces.	Yields small to large amounts of fresh water to wells on the flood plain of the Brazos River.
Tertiary	Pliocene		Goliad Sand	Evangeline aquifer	550	Interbedded sand and clay; in places black chert grains in whitish sand give a salt and pepper effect.	Yields moderate amounts of fresh water.
	Miocene		Fleming Formation	Burkeville aquiclude	200	Predominately clay; contains some thin beds of sand.	Yields small amounts of fresh water.
				Jasper aquifer	1,300	Alternating beds of sand and clay, includes massive beds of gray to brown sand interbedded with gray clay.	Yields moderate to large amounts of fresh to slightly saline water.
			Catahoula Sandstone	Catahoula Sandstone	800	Alternating beds of gray clay, tuff, and sandstone. Lower sandstones may be hard, white, and opaline.	Yields small to moderate amounts of fresh water.
	Eocene		Jackson Group	Jackson Group	1,400	Predominately a terrestial shale; contains clay, volcanic ash, sandstone, and limestone.	Yields small to moderate amounts of water.
		Claiborne Group	Yegua Formation	Yegua Formation	1,300	Interbedded sand and carbonaceous clay, sandy clay, and silt; contains lignite and volcanic ash.	Not known to contain fresh to slightly saline water in Washington County.
			Cook Mountain Formation	Cook Mountain Formation	570	Predominately fossiliferous shale containing a 50-75 foot thick sand bed near the middle of the formation. Contains thin lenses of limestone, glauconitic sandstone and gypsum.	Not known to contain fresh or slightly saline water in Washington County.
			Sparta Sand	Sparta Sand	280	Fine to medium sand containing some brown lignitic shale. In places shale beds divide massive sand into an upper and lower unit.	Not known to yield water to wells in Washington County. May yield moderate amounts of slightly saline water in northwestern part of county.
			Weches Greensand	Weches Greensand	110	Predominately fossiliferous glauconitic shale; some sandstone and thin fossiliferous limestone.	Not known to contain fresh or slightly saline water in Washington County.
			Queen City Sand	Queen City Sand	500	Massive to thin-bedded, ferruginous and slightly lignitic sandstone interbedded with gray or brown, silty, lignitic shale.	Not known to yield water to wells in Washington County. May yield small amounts of slightly saline water.
			Reklaw Formation	Reklaw Formation	270[1]	Gray to brown shale in upper part and glauconitic sandstone interbedded with shale in lower part. The sandstone is fine- to coarse-grained and highly ferruginous.	Not known to contain fresh or slightly saline water in Washington County.
			Carrizo Sand	Carrizo Sand	465[1]	Massive, friable, commonly cross-bedded, well sorted, fine- to medium-grained, light-gray sandstone. Contains increasing amounts of shale downdip.	Not known to yield water to wells in Washington County. May yield small amounts of slightly saline water.

[1] In Lee County.

sorted sandstone containing a small amount of shale. Downdip, the proportion of shale to sand increases progressively. According to Thompson (1966, Figure 7) and Rogers (1967, Figure 6), the Carrizo contains slightly saline water in an area of about 20 square miles in the western part of Washington County. In this area, the Carrizo occurs at a depth of nearly 3,000 feet, and because part of the unit contains saline water, the Carrizo should not be considered as a source of usable water in Washington County.

Reklaw Formation

The Reklaw Formation, which overlies the Carrizo Sand, consists of gray to brown shale in the upper part and glauconitic sandstone interbedded with shale in the lower part. The sandstone is fine to coarse grained and is highly ferruginous. In Lee County (Thompson, 1966), the Reklaw attains a thickness of 150 to 270 feet, is highly faulted in places, and yields only small quantities of water. The Reklaw does not contain fresh or slightly saline water in Washington County.

Queen City Sand

The Queen City Sand conformably overlies the Reklaw Formation. The formation consists of about 500 feet of massive- to thin-bedded, ferruginous, and slightly lignitic sandstone interbedded with gray or brown, silty, lignitic shale. Rogers (1967, Figure 7) shows that slightly saline water probably occurs in the Queen City Sand in the extreme western tip of Washington County. Although the Queen City Sand may yield small amounts of slightly saline water, the depth of its occurrence (more than 2,000 feet) and small areal extent preclude its consideration as a source of water in Washington County.

Weches Greensand

The Weches Greensand disconformably overlies the Queen City Sand (Stenzel, 1938; p. 109-110). The Weches, which is about 110 feet thick, consists predominantly of fossiliferous glauconitic shale containing some sandstone and thin beds of fossiliferous limestone. The Weches Greensand does not contain fresh or slightly saline water in Washington County.

Sparta Sand

The Sparta Sand conformably overlies the Weches Greensand. Most of the Sparta consists of continental deposits of fine to medium, stratified, loose sand. Some individual beds are moderately crossbedded and separated by thin layers of brown lignitic shale. In places, a lignitic shale divides the Sparta into an upper and lower unit.

In Washington County, the Sparta averages about 200 feet in thickness and has a maximum thickness of 280 feet. The formation dips at an average rate of approximately 175 feet per mile, but northeast of the Clay Creek oilfield, the dip of the Sparta steepens to as much as 500 feet per mile. The structural configuration of the top of the unit and the approximate downdip limits of slightly saline water are shown on Figure 6.

Some wells produce water from the Sparta Sand in adjacent Lee and Fayette Counties where the formation is capable of yielding moderate to large amounts of fresh to slightly saline water. In Washington County, no water is being produced from the Sparta, but the aquifer is capable of yielding at least moderate quantities of slightly saline water in the northwestern part of the county.

Cook Mountain Formation

The Cook Mountain Formation consists predominately of fossiliferous shale containing lignite and thin lenses of limestone, glauconitic sandstone, and gypsum. The Spiller Sand Member of Stenzel (1938), which consists of about 50 to 75 feet of gray or brown sand, occurs near the middle of formation (Stenzel, 1940). The Cook Mountain averages about 500 feet in thickness in the county but has an observed maximum of about 570 feet. The unit is not known to contain fresh or slightly saline water in Washington County.

Yegua Formation

The Yegua Formation consists of alternating beds of sand and carbonaceous clay, sandy clay, and silt. Thin beds of lignite and volcanic ash are also present. Although a few persistent sand beds occur, most beds are not traceable over long distances. The Yegua ranges from 800 to 1,300 feet in thickness. It is not known to contain fresh or slightly saline water in Washington County.

Jackson Group

The Jackson Group is a series of predominantly terrestrial shales that conformably overlie the Yegua Formation. Some of the shale is lignitic and glauconitic and contains bentonitic clay, volcanic ash, and some interbedded lenses of limestone (Renick, 1936, p. 33-34).

The Jackson crops out in a 7-mile-wide band in southeastern Lee and northwestern Washington Counties. Electrical logs indicate that the Jackson has a maximum thickness of about 1,400 feet in the southeastern part of the county. The unit is capable of yielding small to moderate amounts of fresh to slightly saline water to wells on the outcrop and in areas a short distance downdip.

Catahoula Sandstone

The Catahoula Sandstone is a series of alternating beds of gray clay, tuff, and sandstone that unconformably overlie the Jackson Group. Sandstones in the lower part may be hard, white, and opaline.

The Catahoula crops out in a ½- to 4-mile-wide band in northern Washington County. Near the outcrop, the unit has a thickness of about 300 feet. In the southeastern part of the county, the thickness increases to a maximum of about 800 feet. The Catahoula is capable of yielding moderate amounts of fresh to slightly saline water to wells on the outcrop and in areas as much as 10 to 15 miles downdip.

Jasper Aquifer

The Jasper aquifer, which is equivalent to the lower part of the Fleming Formation of Miocene age (Table 2), is composed of alternating beds of sand and clay that unconformably overlie the Catahoula Sandstone. The unit includes massive, gray to brown, crossbedded sands interbedded with gray clay.

The Jasper crops out in the central part of the county (Figure 5). The thickness of the formation near the outcrop is about 800 feet, but it thickens rapidly down-dip and reaches a maximum thickness of about 1,300 feet near the Austin-Waller-Washington County line. The Jasper is capable of yielding moderate to large amounts of fresh to slightly saline water and is the most highly developed hydrologic unit in the county.

The approximate altitude of the base of the Jasper aquifer is shown on Figure 7. The dip averages about 80 feet a mile; but locally steepens to as much as 200 feet a mile.

Burkeville Aquiclude

The Burkeville aquiclude consists generally of a massive clay that overlies the Jasper and separates it from the Evangeline aquifer. In Washington County down-dip from the outcrop, it ranges in thickness from about 120 to 200 feet. Although basically a confining layer, the Burkeville contains some thin beds of sand which locally yield small amounts of fresh water.

Evangeline Aquifer

The Evangeline aquifer is a sequence of alternating clays and sands above the Burkeville aquiclude. In places, black chert grains in the whitish sands produce a salt and pepper effect. The Evangeline includes the upper part of the Fleming Formation of Miocene age and the alternating sands and clays of the Goliad Sand of Pliocene age. The Evangeline has a maximum thickness of approximately 550 feet in extreme southeastern Washington County, where the Evangeline yields moderate amounts of fresh water to wells. The approximate altitude of the base of the Evangeline is shown in Figure 6.

Alluvium of the Brazos River

Generally, the alluvial deposits are composed of red-brown to brown clay and silt, fine to coarse sand, and gravel. These sediments lense, interfinger, and grade laterally or vertically into finer or coarser materials. Normally, the finer grained materials predominate in the upper part of the alluvium; the coarser grained materials, such as gravel, occur in the lower part.

Alluvial deposits occur in Washington County as flood plain alluvium and terrace deposits (Cronin and Wilson, 1967). The terrace materials exist as remnants that cap hilltops or stand as isolated bodies above the flood plain. None of the terrace deposits are hydrologically significant in Washington County.

The flood plain alluvium, which consists of sand, gravel, silt, and clay, contains abundant fresh water. These deposits, which rest unconformably on the truncated surfaces of the older bedrock units, attain a maximum thickness of about 75 feet. In places, the alluvium contains extensive gravel beds that are 30 to 40 feet thick.

In addition to the alluvium deposited along the Brazos River, alluvium is also present along Yegua Creek, Jackson Creek, Red Gully, Caney Creek, and Mill Creek. The tributary stream alluvium is in hydrologic continuity with and thus is assigned to the alluvium of the Brazos River.

A more complete discussion of the alluvium of the Brazos River can be found in Cronin and Wilson (1967) and Cronin and others (1963).

GROUND-WATER HYDROLOGY

The general principles of ground-water hydrology as they apply to Washington County are discussed in this section of the report. For additional information, the reader is referred to: Baldwin and McGuinness (1963), Leopold and Langbein (1960), Meinzer (1923a, p. 2-142; 1923b), and Todd (1959, p. 14-114).

Source and Occurrence of Ground Water

Precipitation within the county and in adjoining areas to the north and northwest is the main source of groundwater in Washington County. Most precipitation runs off as streamflow; part is evaporated at the land surface, transpired by plants or retained by capillary

Jackson Group

Water from the Jackson Group varies widely in chemical content. The samples collected contain dissolved solids ranging from 66 to 4,998 mg/l. Seven of the 23 wells sampled yield water with a dissolved solids content in excess of 1,000 mg/l. Five wells produce water with a pH of less than 7. One of these, a dug well 45 feet deep (YY-59-44-704), yields water with a pH of 6.2. Although the concentrations of most dissolved constituents in the water from this well are low, (Table 9), the water has a bitter taste and locally is called "alum water".

Catahoula Sandstone

Water in the Catahoula Sandstone is generally of better quality than that from the Jackson, but not quite as good as water from the overlying Jasper aquifer. In Washington County, water in the Catahoula Sandstone ranges from moderately hard to very hard. Calcium is usually the predominate cation; either chloride or bicarbonate is the principal anion. In the outcrop and for four or five miles downdip, dissolved solids average about 500 mg/l.

Jasper and Evangeline Aquifers

Water from these aquifers is typically a calcium bicarbonate type. The concentration of dissolved solids usually ranges from about 300 to 500 mg/l. Characteristically, the water is very hard. The water usually has a pH greater than 7 and contains less sulfate than is found in the underlying aquifers. Iron and manganese may cause problems in the Jasper aquifer in Washington County. Iron content in the Jasper ranges from none to 4.5 mg/l, averaging 0.52 mg/l. Water from the Jasper and Evangeline aquifers usually is suitable for public supply and irrigation, and many types of industry.

Alluvium of the Brazos River

Samples from only three wells tapping the Brazos River alluvium exclusively were collected; many of the wells tap not only the alluvium but also underlying aquifers. The dissolved-solids content in the three samples ranged from 303 to 691 mg/l; the hardness ranged from 233 to 411 mg/l, and the chloride from 29 to 201 mg/l.

In adjacent Brazos and Burleson Counties, Cronin and Wilson (1967, p. 195-198) show analyses of water from 68 wells tapping the alluvium. Water from these wells is of a calcium bicarbonate type that has an average hardness of about 500 mg/l; and contains dissolved solids ranging from 208 to 2,217 mg/l. Iron exceeded the recommended limit of 0.3 mg/l in about 75 percent of the 54 samples analyzed. These analyses are probably representative of the quality of water in the alluvium in Washington County.

These data indicate that water from the alluvium of the Brazos River is suitable for irrigation of most crops. In Washington County it is used primarily for supplementary row-crop irrigation. Because water from the alluvium of the Brazos River is subject to contamination, it should be carefully checked before being considered for public supply or domestic use.

Protection of Ground Water

A potential source of contamination of ground water exists in the possible movement of brines from the underlying salt-water bearing formations through improperly cased oil wells or improperly plugged oil tests. In Washington County, however, no instances of such contamination have been reported. The Oil and Gas Division of the Texas Railroad Commission is responsible for protection of ground water. At their request, the Texas Water Development Board makes recommendations for the depth to which water-bearing formations are to be protected.

Field rules published by the Railroad Commission for Washington County show that ground water should be protected to a depth of 1,600 feet in the abandoned Arthur Harvey Wilcox field. The base of fresh water at the field (Figure 15) is about 700 feet below land surface. Field rules have not been established for the other fields in the county.

Another potential source of contamination is the infiltration of oilfield brine from disposal pits on the outcrops of the aquifers. In 1967, brine production in Washington County was 627,597 barrels, or 26,359,074 gallons. Of this, 624,012 barrels (26,208,504 gallons), were used for water flood injection into the Sparta Sand and Queen City Sand in Clay Creek oilfield. The remainder, about half of one percent or 3,585 barrels (150,570 gallons), was disposed of in unlined surface pits (Texas Water Development Board, 1967). There are no reported cases of contamination from pits in Washington County; however, because of the slow rate of ground-water movement, any contamination resulting from brine disposal may not be detected for years.

Contamination may also occur by the infiltration of industrial effluents and sewage in the shallow parts of the aquifers.

AVAILABILITY OF GROUND WATER

Fresh water in varying amounts and at varying depths is available throughout Washington County. The approximate altitude of the base of fresh water (less than 1,000 mg/l dissolved solids) as determined from

RECYCLED PRODUCTS CORPORATION
4111 Shorecrest Drive - Dallas, Texas 75209
Phone 214/358-1844 Fax 214/358-4230

December 30, 1994

Ms. Laura Ray, Staff Attorney
TEXAS NATURAL RESOURCE CONSERVATION COMMISSION
P. O. Box 13087
Austin, Texas 78711-3087

Re: Solid Waste Registration No. 82313 (formerly 30897) Otherwise known as the Old Brazon Forge Property (Hussman) in Brenham, Texas, owned by Reconversion Technologies of Texas.

Dear Ms. Ray:

On December 20th, 1994, I was in attendance at a meeting in your offices along with representatives of Retek and Hussman. Although I have never owned any stock in Recycled Products Corporation, I am President. I was there to represent RPC.

RPC is a shell corporation with no significant cash value assets. I, personally, am in Chapter 11. I have been in bankruptcy since July 1990, and I see no change in that status for several years to come.

Allow me to review for you the facts surrounding RPC's involvement, if any:

1. RPC bought the subject property from Hussman on or about May 31, 1992.

2. RPC sold the subject property on or about August 1, 1992 to Retex, with the understanding that they would do the sampling, inspections and all things necessary to be in compliance..

3. RPC never operated a manufacturing of facility there. Not even for one day. RPC never applied for electrical power at the subject property. RPC never contributed one ounce of pollution of any kind to the subject property.

4. Jim Turner was President of Retex on or about August 1, 1992. This relationship was terminated abruptly on August 25, 1993. During my term as President, Retex kept up its agreement with Hussman relating to inspections and care of the fenced in area. I believe that Retex was in full compliance and never contributed to any pollution of the property

during this time. I have no knowledge of what has happened on the property since August 25, 1993. I was ordered not to set foot on the property again. I haven't!

5. If RPC, because of technical ownership for two months, should be assessed any penalties, I'll assure you that RPC does not have the financial capability to participate. I personally do not have the financial ability to be any help whatsoever, including paying my own expenses to come to Austin for meetings. My knowledge is so limited that my intellectual contribution is thimble-sized. On the other hand, I want to be as helpful as possible because I am dedicated to keeping this earth clean for future generations.

Sincerely yours,

James E. Turner

James E. Turner, Individually

James E. Turner

James E. Turner, President of Recycled Products Corporation

MEETING MEMO TO THE FILE

Participants: Connie Wong Ray Newby	Representing: TNRCC OCE/Waste TNRCC PCD/SSDAT
Date of Meeting: 02/16/96	File No.: SWR# 30897 and 82313
Location: TNRCC Austin Bldg. F	Subject: Old Brazos Forge Site

Information for File: Meeting was conducted with Connie Wong, enforcement coordinator, to brief Ray Newby, SSI project manager, on the regulatory and technical background of the subject site. The following information summarizes the current status of the site:

The site is known to have on-site soil and ground water contamination from heavy metal constituents.

Off-site sediment and ground water contamination has been documented.

Off-site drinking water wells have been impacted in the apparent downgradient direction of the site. It is believed that the persons currently affected by the contaminated drinking water have obtained bottled water supplies or are supplied by a water supply company.

An off-site trailier home located adjacent to the site and to the west is believed to be supplied by well water. Details regarding the identity of the owner and completion information of the water well are currently unknown.

Heavy metals have been detected in on-site monitor wells. Monitor wells may need to be redeveloped prior to sampling as PRP consultant has reported turbid samples.

Site operated as a metal wire products facility since mid 1960s until late 1980s. Heavy metal contaminated water was discharged from west side of plant to three trenches which conveyed waste water to three unlined settling lagoons. Waste water was then discharged to stream.

Long history of inspections in files for both SWR #s.

Paula McCormick of TNRCC inspected site in 1986 and noted blue-discolored sediments in intermittent stream. Soil samples indicated chormium and nickel impacts.

Don Wyrick is TNRCC Region 9 contact for this site.

Signed: ______________________

MEETING MEMO TO THE FILE

Participants: Connie Wong Ray Newby	Representing: TNRCC OCE/Waste TNRCC PCD/SSDAT
Date of Meeting: 03/12/96	File No.: SWR# 30897 and 82313
Location: TNRCC Austin Bldg. F	Subject: Old Brazos Forge Site

Information for File: Meeting was conducted with Connie Wong, enforcement coordinator, to answer additional questions regarding site from Ray Newby, SSI project manager, on the regulatory and technical background of the subject site. The following information summarizes the current status of the site:

Besides the registered industrial supply water well located west of the facility building, no information was found in well logs concerning two other on-site water wells indicated on a site map that was attached to an EPA correspondence.

One of the residential wells sampled previously, the Jerry Krueger residence, is apparently the well indicated on the plotted well log as owned by C. Geick.

Signed: [signature]

TELEPHONE MEMO TO THE FILE

Call to: Dave Terry TNRCC/WU	Call From: Ray Newby
Date of Call: 03/11/96	File No.: TXD048901235
Phone No.: 239-4755	Subject: Wellhead Protection Areas (WPAs)
Information for File: I inquired with Dave as to the presence of any known designated WPAs in the vincinity of Brenham (Washington County), Texas. Dave said that there were no WPAs in Washington County. The closest one was located near Clay (Burleson County), Texas.	

Signed: Ray Newby

TELEPHONE MEMO TO THE FILE

Call to: Larry Firestone City of Brenham	Call From: Ray Newby, TNRCC
Date of Call: 03/08/96	File No.: TXD048901235
Phone No.: 409-277-1266	Subject: City of Brenham Water Wells

Information for File: I called Larry to inquire as to the status of the City of Brenham's water wells. Larry stated that only one well, City of Brenham #12 was operational. The well is used as emergency backup for a population of approximatley 13,000 persons. Drinking water is currently obtained from Lake Somerville on the Brazos River. The residences outside the City of Brenham along Burleson Street are supplied by the well located at the Country Place Northwest subdivision. Jim Brown, a City of Brenham day supervisor maintains the Country Place NW well as a second job.

Signed: R Newby

An accurate one-word description of Texas is "diverse." No other state has the range of geography it has - from the Piney Woods of East Texas to the mountains of El Paso to the coastline of the Gulf of Mexico to the plains of the Panhandle.

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- ★ Courageous Texans: 65 won the Congressional Medal of Honor
- ★ 1990: The year of women in Texas politics
- ★ Archaeology: Who were the first Texans?
- ★ A political scorecard for Texas counties

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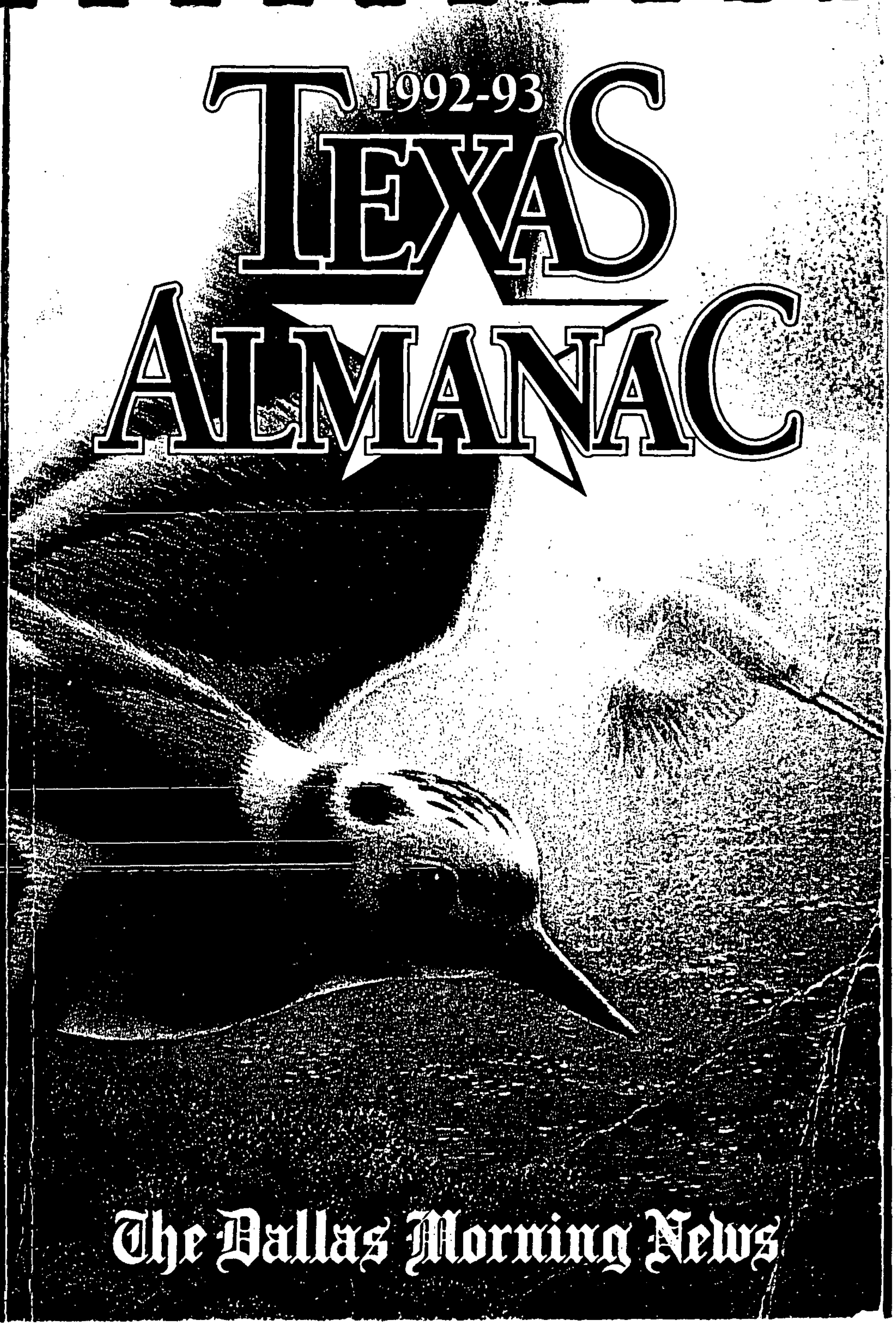

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1992-93 TEXAS ALMANAC

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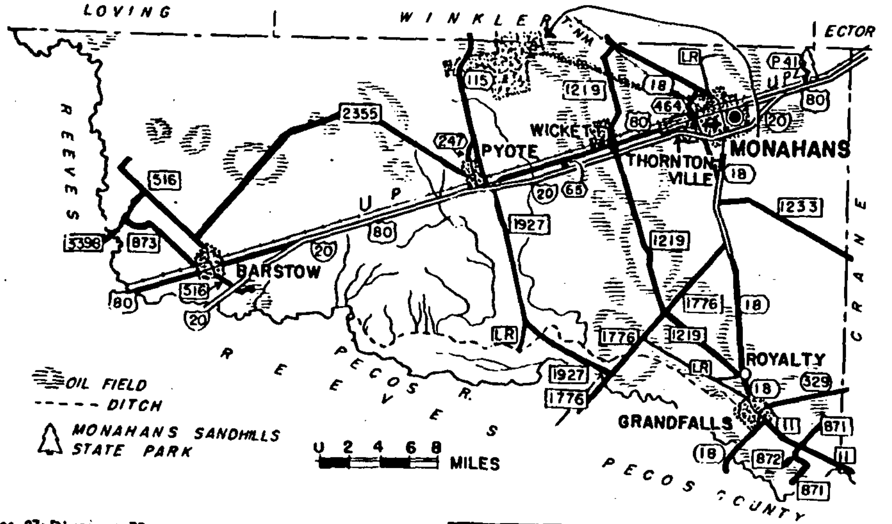
Virginia Gardner, *Production*



riages, 97; Divorces, 72.

Ethnicity, 1990: White, 9,905 (75.5%); Black, 457 (3.5%); American Indian, 75 (0.6%); Asian, 25 (0.2%); Hispanic, 4,830 (36.8%); Other, 2,653 (20.2%).

Recreation: Monahans Sandhills State Park, Museum; Pyote Rattlesnake Museum; Million Barrel Museum; county park; local events.

Minerals: Production of oil, gas, sand and gravel.

Agriculture: Income mostly from beef cattle; cotton, hay grown; some irrigation for cotton.

Business: Oil, gas, other minerals dominate economy.

MONAHANS (8,101) county seat; center for oil, agribusiness; gasoline plant; pecan shelling; county hospital, nursing home. Other towns, **Barstow** (535); **Grandfalls** (583); **Pyote** (348), West Texas Children's Home; **Thorntonville** (693); **Wickett** (560).

Washington County

LOCATION: Southeast (M-18).

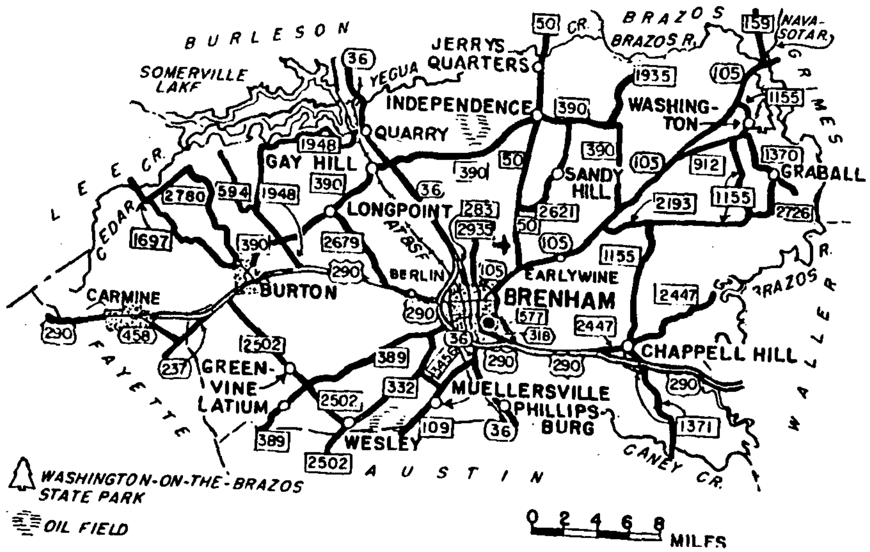
Cong. Dist.	10	U.S. Jud. Dist.	W-An.
St. Sen. Dist.	5	Ct. Appeals	1, 14
St. Rep. Dist.	13	Admin. Jud. Dist.	2
St. Dist. Cts.	21, 335		

History: Named for George Washington; an original county; created 1836; organized 1837.

Physical Features: Rolling prairie of sandy loam, alluvial soils; Brazos River and tributaries.

Population	26,154	Av. Weekly Wage	$334.46
Area (sq. mi.)	621.3	Density	43
Land Area	609.2	Water Area	12.1
Civilian Labor	12,909	Jobless Rate	3.0
Altitude (ft.)	460-343	Retail Sales	$173,770,059
Rainfall (in.)	39.7	Gross Sales	$602,662,360
Jan. min.	39	Reg. Voters	13,868
July max.	96	Election Turnout	60.9
Grow. Season (days)	277	Vehicles	24,529
Total Income (mil.)	$457	Lane Miles	624
Per Capita Income	$17,529	Tax Value	$1,409,218,145
Total Wages	$180,389,495	Fed. Spending	$70,324
Housing	11,664	Defense Spending	$2,623

Vital Statistics, 1989: Births, 361; Deaths, 290; Marriages, 197; Divorces, 102.



Washington Co. (Cont.)

Ethnicity, 1990: White, 19,782 (75.6%); Black, 5,463 (20.9%); American Indian, 46 (0.2%); Asian, 186 (0.7%); Hispanic, 1,158 (4.4%); Other, 677 (2.6%).

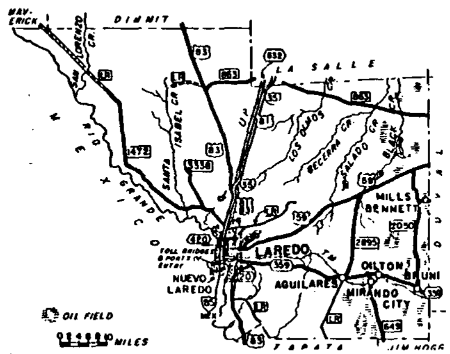
Recreation: Many historic sites; **Washington-on-the-Brazos State Park; Texas Baptist Historical Museum; Star of Republic Museum; Somerville Lake;** fishing, hunting; old homes; bluebonnet trails in spring, cotton-gin festival in April.

Minerals: Oil, natural gas and stone.

Agriculture: Most income from cattle, hogs, horses, dairy products, poultry; crops chiefly hay, cotton, horticultural plants.

Business: Agribusinesses, oil, tourism, manufacturing.

BRENHAM (11,952) county seat; cotton processing; varied manufacturing; **Blinn College, Brenham State School.** Other town, **Burton** (311), national landmark cotton gin, local activities.



Webb County

LOCATION: Southwest (R-13).

Cong. Dist.	23	U.S. Jud. Dist.	S-La.
St. Sen. Dist.	21	Ct. Appeals	4
St. Rep. Dist.	43	Admin. Jud. Dist.	4
St. Dist. Cts.	49, 111, 341		

History: Named for Republic of Texas leader James Webb; created, organized 1848 from Nueces and Bexar counties.

Physical Features: Rolling, some hills; much brush; sandy, gray soils; alluvial along Rio Grande.

Population	133,239	Av. Weekly Wage	$293.94
Area (sq. mi.)	3,375.6	Density	40
Land Area	3,356.9	Water Area	18.7
Civilian Labor	53,159	Jobless Rate	10.8
Altitude (ft.)	899-372	Retail Sales	$1,494,265,174
Rainfall (in.)	20.1	Gross Sales	$2,629,969,590
Jan. min.	45	Reg. Voters	47,221
July max.	99	Election Turnout	30.6
Grow. Season (days)	322	Vehicles	79,809
Total Income (mil.)	$1,066	Lane Miles	885
Per Capita Income	$8,043	Tax Value	$3,956,555,217
Total Wages	$662,179,952	Fed. Spending	$307,889
Housing	37,053	Defense Spending	$11,476

Vital Statistics, 1989: Births, 3,614; Deaths, 711; Marriages, 1,262; Divorces, 270.

Ethnicity, 1990: White, 93,657 (70.3%); Black, 156 (0.1%); American Indian, 201 (0.2%); Asian, 484 (0.4%); Hispanic, 125,069 (93.9%); Other, 38,741 (29.1%).

Recreation: Major tourist gateway to Mexico; hunting, fishing; **Casa Blanca Lake,** water recreation, golf; Border Olympics in March; Rio Grande art festival in April; **Washington's Birthday** celebration; historic sites; museum; **Fort McIntosh.**

Minerals: Production of natural gas, oil, stone, sand and gravel.

Agriculture: Among leading beef-cattle counties, stocker production growing; crops include vegetables, grain sorghums, cotton; about 4,500 acres irrigated.

Business: International trade, tourism, oil and gas operations, government center; manufacturing, agribusinesses; a major gateway for trade and tourism with Mexico.

LAREDO (122,899) county seat; founded in 1755 by Tomas Sanchez; varied manufacturing; meat packing; major rail, highway gateway to Mexico; **Laredo Junior College, Laredo State University;** mental health center; hospitals, nursing homes; many tourist facilities. Other town, **El Cenizo** (1,399).

Wharton County

LOCATION: Southeast (Q-18).

Cong. Dist.	14	U.S. Jud. Dist.	S-Hn.
St. Sen. Dist.	5	Ct. Appeals	13
St. Rep. Dist.	29	Admin. Jud. Dist.	2
St. Dist. Cts.	23, 329		

History: Named for John A. and William H. Wharton, brothers active in the Texas Revolution; county created, organized 1846 from Jackson, Matagorda counties.

Physical Features: Prairie; bisected by Colorado River; alluvial, black, sandy loam soils.

Population	39,955	Av. Weekly Wage	$321.98
Area (sq. mi.)	1,094.5	Density	37
Land Area	1,090.2	Water Area	4.3
Civilian Labor	21,969	Jobless Rate	4.3
Altitude (ft.)	148-71	Retail Sales	$260,119,694
Rainfall (in.)	41.3	Gross Sales	$551,757,013
Jan. min.	44	Reg. Voters	18,816
July max.	93	Election Turnout	46.4
Grow. Season (days)	266	Vehicles	36,009
Total Income (mil.)	$574	Lane Miles	919
Per Capita Income	$14,670	Tax Value	$2,116,357,161
Total Wages	$225,072,437	Fed. Spending	$115,491
Housing	16,262	Defense Spending	$2,721

Vital Statistics, 1989: Births, 666; Deaths, 393; Marriages, 308; Divorces, 165.

Ethnicity, 1990: White, 29,127 (72.9%); Black, 6,308 (15.8%); American Indian, 38 (0.1%); Asian, 131 (0.3%); Hispanic, 10,103 (25.3%); Other, 4,351 (10.9%).

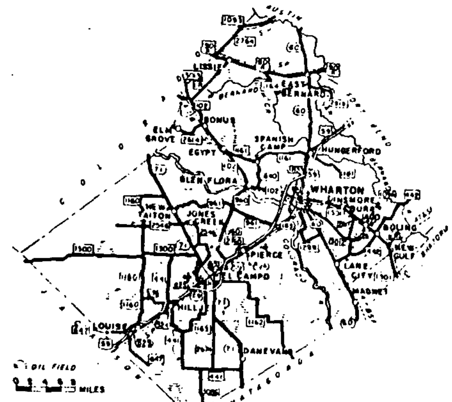
Recreation: Hunting, fishing; big-game trophy, art and historical museums; historic sites; festivals.

Minerals: Production of oil, gas, sulphur.

Agriculture: Most income from crops; leading rice-producing county; other crops are sorghums, cotton, corn; cow-calf operations, poultry important; about 115,000 acres irrigated, mostly rice and corn.

Business: Economy based on oil, sulphur, other minerals; agribusinesses, varied manufacturing.

WHARTON (9,011) county seat; mineral, produce processing; hospitals, clinics, nursing homes; **Wharton County Junior College.** Other towns, **El Campo** (10,511), aluminum processing, manufacturing, rice processing, storage; plastic, styrofoam processing; wholesale nursery; hospital, nursing home; local events; **East Bernard** (1,544), agribusiness, varied manufacturing; **Boling-Iago** (1,119).



Wheeler County

LOCATION: Eastern Panhandle (C-11).

Cong. Dist.	13	U.S. Jud. Dist.	N-Am.
St. Sen. Dist.	31	Ct. Appeals	7
St. Rep. Dist.	88	Admin. Jud. Dist.	9
St. Dist. Cts.	31		

The State of Texas Water Quality Inventory

SURFACE WATER QUALITY MONITORING PROGRAM

94

12th Edition, 1994 • Prepared Pursuant to Section 305(b) Federal Clean Water Act

Basin Summaries, Basin Maps, Segment Fact Sheets, and Water Quality Status Tables (Basins 1 - 12)

2

VOLUME TWO

SFR-11 ◆ 11/94

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

THE STATE OF TEXAS WATER QUALITY INVENTORY

12th Edition
1994

Prepared Pursuant to
SECTION 305(b)
FEDERAL CLEAN WATER ACT

VOLUME 2

Basin Summaries, Basins Maps, Segment Fact Sheets, and Water Quality Status Tables (Basins 1-12)

by the

Texas Natural Resource Conservation Commission

November 1994

SEGMENT 1202 OF THE BRAZOS RIVER BASIN

NAME: Brazos River Below Navasota River

DESCRIPTION: from a point 100 meters (110 yards) upstream of SH 332 in Brazoria County to the confluence of the Navasota River in Grimes County

LENGTH/SURFACE AREA: 199 miles (320 kilometers)

SEGMENT CLASSIFICATION: Water Quality Limited SEGMENT RANK: 38
Cause: Water Quality Standards Violations

DESIGNATED WATER USES: Contact Recreation
High Quality Aquatic Habitat
Public Water Supply

USE ATTAINABILITY ANALYSIS: None

STATIONS MONITORED IN THE LAST FOUR YEARS ON SEGMENT: 4 OFF SEGMENT: 5

PUBLISHED STUDIES: None

AMBIENT TOXICITY MONITORING STATIONS: None

SUMMARY OF FISH KILLS: 2

Waterbody	Date	Cause	Size of Kill
Allens Creek	07/26/91	Low dissolved oxygen	101-1,000
Irrigation Canal near Rosenburg	09/05/91	Low dissolved oxygen	101-10,000

FISH CONSUMPTION ADVISORIES AND/OR CLOSURES: None

PERMITTED FACILITIES (FINAL):

Domestic	47 outfalls	28.79 MGD
Industrial	21 outfalls	4.20 MGD
Total	68 outfalls	32.99 MGD

SEGMENT SUMMARY:

Elevated fecal coliform densities cause nonsupport of the contact recreation use in the upper portion of the segment. Ortho and total phosphorus levels are elevated.

FLOOD HAZARD BOUNDARY MAP

WASHINGTON COUNTY, TEXAS

UNINCORPORATED AREA

PAGE 6 OF 10

(SEE MAP INDEX FOR PAGES PRINTED)

EFFECTIVE DATE:
MAY 24, 1977

COMMUNITY-PANEL NO.
481188 0006 A

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

KEY TO SYMBOLS

:IAL FLOOD HAZARD
AREA

ZONE A

'hese maps may not include all Special Flood Hazard
ın the community. After a more detailed study, the
l Flood Hazard Areas shown on these maps may be
ed, and other areas added.

**ILT NFIA SERVICING COMPANY OR LOCAL INSURANCE
' OR BROKER TO DETERMINE IF PROPERTIES IN THIS
JNITY ARE ELIGIBLE FOR FLOOD INSURANCE.**

APPROXIMATE SCALE IN FEET:

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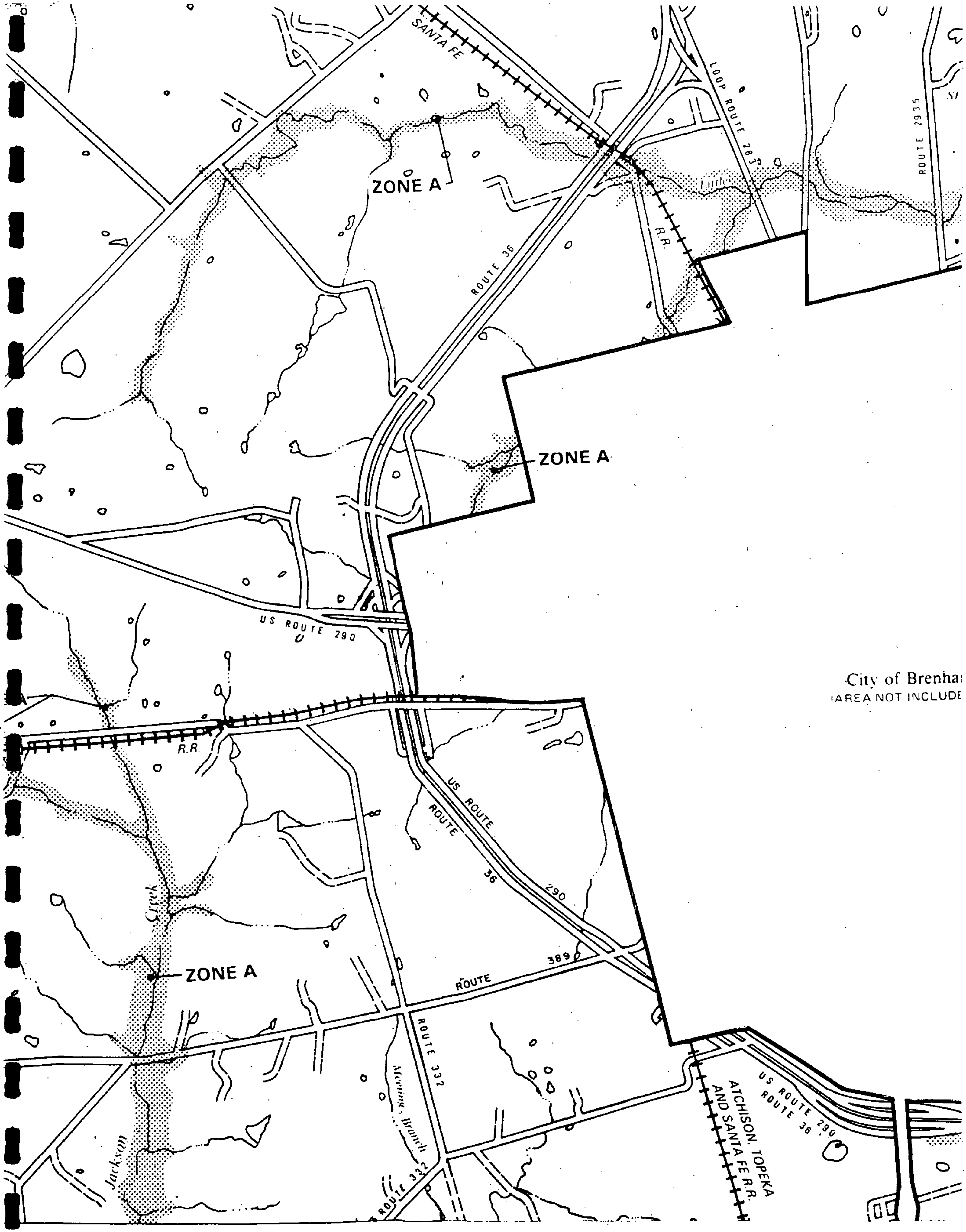
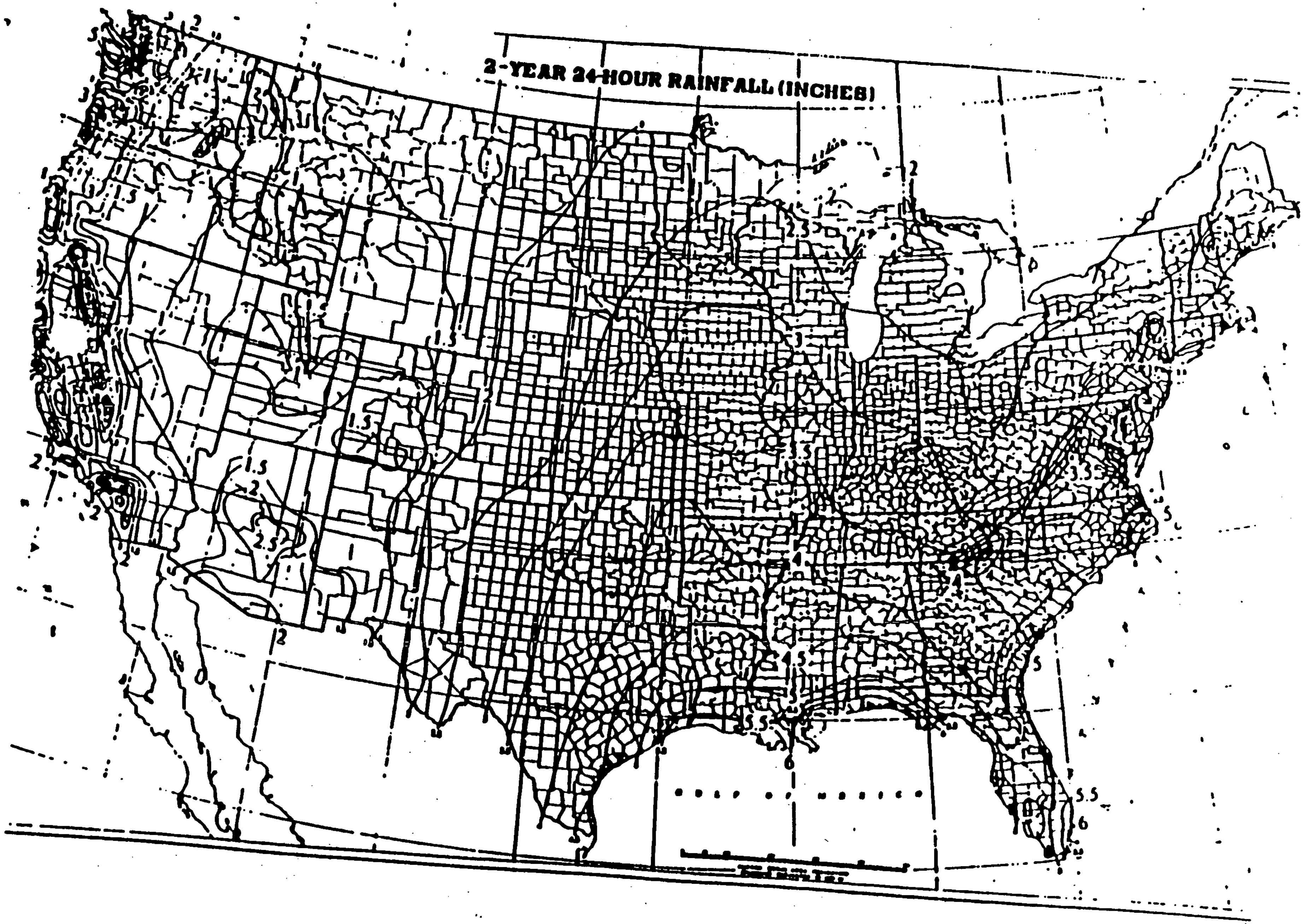
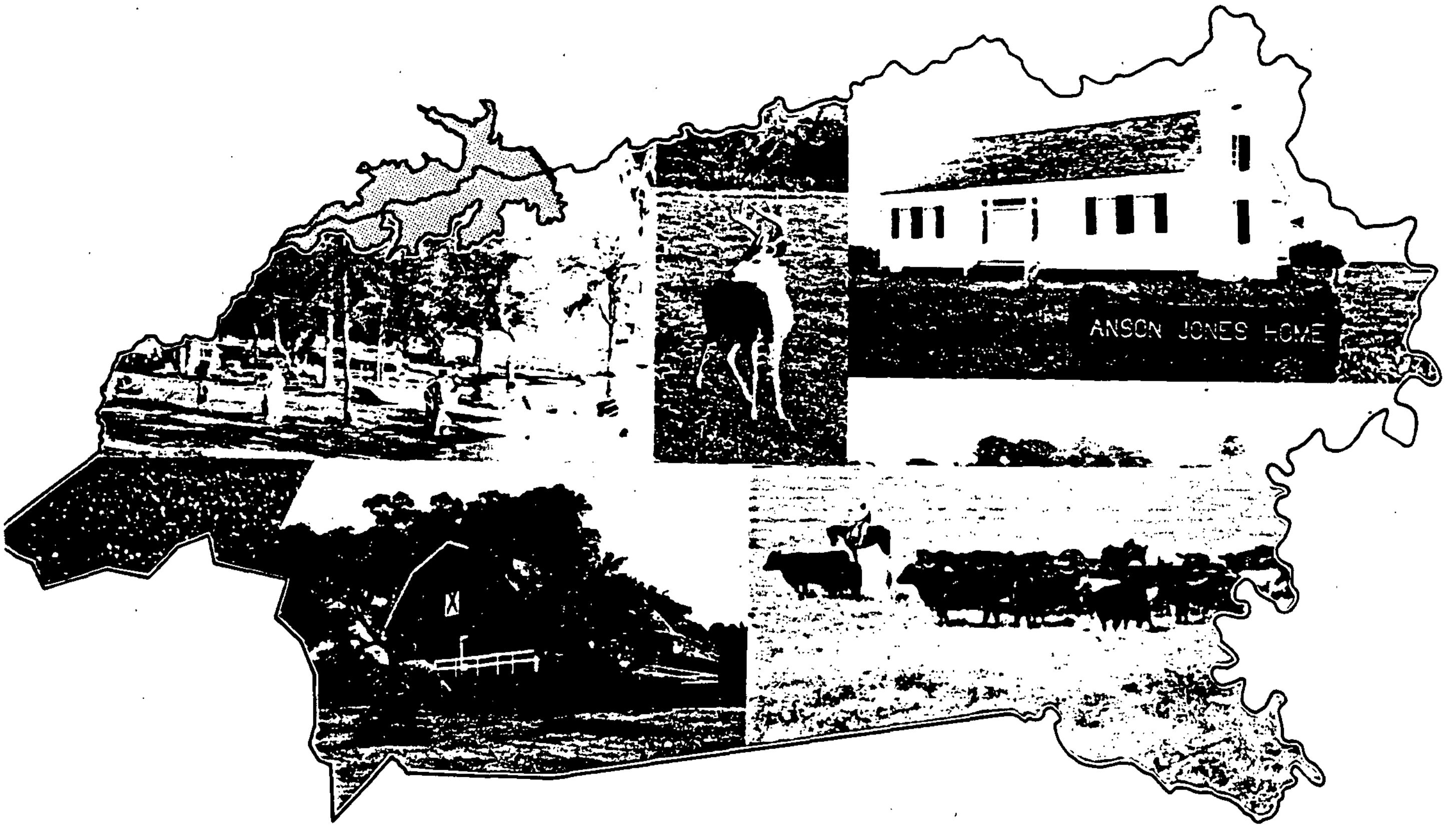

SANTA FE
LOOP ROUTE 283
ROUTE 2935
ZONE A
Little
R.R.
ROUTE 36
ZONE A
US ROUTE 290
City of Brenha
AREA NOT INCLUDE
R.R.
US ROUTE
ROUTE
36
290
Creek
ZONE A
389
ROUTE
ROUTE 332
Mewing Branch
Jackson
ROUTE 332
US ROUTE 290
ROUTE 36
ATCHISON, TOPEKA
AND SANTA FE R.R.

Herschfield. D.M., 1961. Rainfall Frequency Atlas of the United States. U.S. Weather Bureau Technical Paper No. 40.


2-YEAR 24-HOUR RAINFALL (INCHES)
GULF OF MEXICO

ɩgton County
Texas



United States Department of Agriculture
Soil Conservation Service
In Cooperation with
Texas Agricultural Experiment Station

soil survey of Washington County, Texas

By W. Glen Chervenka, Joseph J. Castille, Maurice R. Jurena, and Michael Stewart, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service in cooperation with the Texas Agricultural Experiment Station

WASHINGTON COUNTY is located in southeast central Texas in the Blackland Prairies Land Resource Area and the Claypan Land Resource Area. It has a total of 392,960 acres, or 614 square miles. The county has an irregular shape and is approximately 40 miles long and 20 miles wide.

The survey area is mostly gently sloping to sloping, but some parts of the landscape are nearly level and some parts are moderately steep and steep. The elevation ranges from 200 to 500 feet and is highest in the northern part of the county.

The main agricultural industries of the county are beef production and dairying. Some cultivated crops are grown.

The soils formed under post oak and grass. Those soils that formed under timber are light-colored fine sandy loams and loamy fine sands, and those that formed under grass are dark fine sandy loams, clay loams, and clays. If unprotected, these soils are subject to water erosion.

Descriptions, names, and delineations of soils in this soil survey do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowledge of soils, modifications of series concepts, intensity of mapping, or the extent of soils within the survey.

general nature of the survey area

In this section the settlement and population, climate, agriculture, and natural resources are briefly described.

settlement and population

Washington county, named for George Washington, was created in 1836 from a part of Stephen F. Austin's colony. This county was of great importance to the early settlement of Texas. Among many other historical places is Washington On The Brazos, the birthplace of Texas independence. Brenham, the county seat, had a population of 8,922 in 1970. The county population in 1970 was 18,842. The major settlement of the county was in the 1850's and 1860's mainly by immigrants of German, Czechoslovakian, and Polish descent.

At present the county is crossed by three major highways that join central and south-central Texas with Houston and the gulf coast.

climate

Prepared by the National Climatic Center, Asheville, North Carolina.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Brenham, Texas, in the period 1951 to 1976. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 52 degrees F, and the average daily minimum temperature is 41 degrees. The lowest temperature on record, which occurred at Brenham on February 2, 1952, is 9 degrees. In summer the average temperature is 83 degrees, and the average daily maximum temperature is 95 degrees. The highest recorded temperature, which occurred on August 11, 1962, is 110 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 39.65 inches. Of this, 21 inches, or 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 15 inches. The heaviest 1-day rainfall during the period of record was 6.85 inches at Brenham on September 12, 1961. Thunderstorms occur on about 30 days each year, and most occur in summer.

Snowfall is rare. In 80 percent of the winters, there is no measurable snowfall. In 10 percent, the snowfall, usually of short duration, is more than 3 inches. The heaviest 1-day snowfall on record was more than 3 inches.

The average relative humidity in midafternoon is about 60 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 80 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the south-southeast. Average windspeed is highest, 15 miles per hour, in April.

Tornadoes and severe thunderstorms occur occasionally. These storms are local and of short duration. The pattern of damage is variable and spotty.

agriculture

The main agricultural enterprises in Washington County are beef and dairy cattle ranches. A small amount of row crops, such as corn, cotton, and grain sorghum, are grown.

During early settlement almost all of the county was cultivated. The rolling topography, slope, and soil erosion have reduced the yields of row crops. Recently, much of the land has been used for pasture, and cattle production has increased. Established pastures of improved bermudagrass, kleingrass, and bahiagrass have replaced areas of native grass and old, eroded fields.

Approximately 60 percent of the county belongs to absentee owners, most of whom reside in the city of Houston, about 70 miles away. Many people have retired to this area and others plan to do so. The small farms are for recreation and retirement. These people increase the value of their properties by improving buildings, constructing fences, building roads, planting grasses, and controlling erosion.

natural resources

Soil is the most important natural resource in Washington County. Oil, gas, lignite, rock, gravel, and water are also important. Numerous shallow oil wells are in the southwest part of the county. A limited amount of lignite is in the north part of the county. Rock and gravel are in the northern and the eastern parts of the county. Underground water for home use is easily available throughout the central part of the county. Lake Somerville is also a good source of high quality water.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, rangeland and woodland managers, engineers, planners, developers and builders, home buyers, and others.

This soil is in capability subclass VIe and the Claypan Savannah range site.

5—Belk clay, 0 to 1 percent slopes. This deep, nearly level soil is on bottom lands. Individual areas are elongated and are 50 to 125 acres. This soil is rarely flooded.

Typically, the surface layer is reddish brown clay about 25 inches thick. From 25 to 62 inches is dark brown silt loam. This soil is calcareous and moderately alkaline throughout.

This soil is well drained. Runoff is slow. Permeability is very slow. Natural fertility is high and organic matter content is medium. Available water capacity is high. The hazard of water erosion is slight.

Included in some mapped areas of this soil are small areas of Brazoria, Clemville, Norwood, and Trinity soils. Included soils make up less than 15 percent of a mapped area.

This soil is used dominantly for crops.

This soil has high potential for crop production, but it needs proper management, which includes additions of fertilizer. This soil is well suited to grain sorghum and cotton. It is also well suited to bahiagrass and kleingrass pasture.

This soil has low potential for most urban and recreational development. Flooding and very slow permeability are limitations for both.

This soil is in capability subclass IIIs and the Clayey Bottomland range site.

6—Bleiblerville clay, 1 to 3 percent slopes. This deep, gently sloping soil is on uplands. Individual areas are irregularly shaped and are 20 to 200 acres in size.

Typically, the surface layer is very dark gray clay about 33 inches thick. From 33 to 63 inches is dark gray clay. The underlying layer from 63 to 75 inches is pale yellow clay mottled with dark gray. This soil is calcareous and moderately alkaline throughout.

This soil is moderately well drained. Runoff is medium. Permeability is very slow. Natural fertility and organic matter content are high. Available water capacity is high. The hazard of water erosion is moderate.

Included in some mapped areas of this soil are small amounts of Frelsburg, Latium, and Brenham soils and of Bleiblerville clay, 0 to 1 percent slopes. Included soils make up less than 20 percent of a mapped area.

This soil is used dominantly as rangeland and improved pasture (fig. 6). Some areas are used for corn and grain sorghum, and some are used for native grass hay (fig. 7). Most areas of this soil have been cultivated at one time or another.

The soil has high potential for forage or crop production, but it needs proper management and additions of fertilizer. The main suited crops are cotton, corn, and grain sorghum.

This soil has low potential for most urban and recreational development. Shrink-swell properties and very slow permeability are limitations, and low strength is also a limitation for roads and streets.

This soil is in capability subclass IIe and the Blackland range site.

7—Bleiblerville clay, 3 to 5 percent slopes. This deep, gently sloping soil is on uplands. Individual areas are irregularly shaped and are 15 to 125 acres.

Typically, the surface layer is black clay about 15 inches thick. From 15 to 62 inches is dark gray clay. The underlying layer from 62 to 73 is mottled gray and olive clay. The soil is calcareous and moderately alkaline throughout.

This soil is moderately well drained. Runoff is medium. Permeability is very slow. Natural fertility and organic matter content are high. Available water capacity is high. The hazard of water erosion is severe.

Included in some mapped areas of this soil are small amounts of Frelsburg, Latium, and Brenham soils. Included soils make up less than 15 percent of a mapped area.

This soil is used dominantly for native or improved pasture.

The soil has medium potential for crops. The main crops are cotton, corn, and grain sorghum. This soil has high potential for pasture production, but it needs proper management, which includes additions of fertilizer.

This soil has low potential for most urban and recreational development. Shrink-swell properties, very slow permeability, and, for roads and streets, low strength are limitations.

The soil is in capability subclass IIIe and the Blackland range site.

8—Bosque clay loam, frequently flooded. This deep, nearly level soil is on bottom lands. Slopes are 0 to 1 percent. Individual areas are elongated and are 70 to 300 acres.

Typically, the surface layer is dark gray clay loam about 22 inches thick. From 22 to 40 inches is mottled grayish brown and pale brown loam. The underlying layer from 40 to 62 inches is dark gray clay loam. This soil is calcareous and moderately alkaline throughout.

This soil is well drained. Runoff is slow to medium. Permeability is moderate. Natural fertility and organic matter content are high. Available water capacity is high. This soil floods briefly 1 to 3 times each year. The hazard of water erosion is slight.

Included in some areas of this soil are small areas of Gowen and Nahatche soils. Included soils make up less than 20 percent of a mapped area.

Areas of this soil that have sparse to dense stands of pecan, elm, or hackberry trees are used dominantly for native or improved pasture. A few of the higher areas are cultivated.

This soil has high potential for forage production, but it needs good management and proper fertilization. It has low potential for crops because of the hazard of flooding.

Typically, the surface layer of the Burlewash soil is light brownish gray fine sandy loam about 8 inches thick. The subsoil from 8 to 23 inches is brown clay. The underlying layer from 23 to 40 inches is stratified clay and white sandstone. The soil is typically very strongly acid throughout.

The Burlewash soil is well drained. Runoff is medium. Permeability is very slow.

Typically, the surface layer of the Koether soil is light brownish gray stony loamy sand about 16 inches thick. The underlying material is strongly cemented sandstone. The soil is typically very strongly acid throughout.

The Koether soil is somewhat excessively drained. Runoff is rapid. Permeability is rapid; however, the sandstone is impervious except for the cracks and fissures.

Other soils in this association are small amounts of Falba, Shalba, and Rehburg soils.

These soils are used as rangeland and for wildlife habitat.

The soils are not suited to cultivation because of steep slopes, shallow depths, and stones. In most areas vegetation is post oak, blackjack oak, yaupon, and bluestem grass.

These soils have low potential for urban and recreational development because of slopes, stones, and very slow permeability. The esthetic value of these areas is high because of the scenic views created by the steep and broken landscape.

These soils are in capability subclass VIIs and Claypan Savannah range site.

18—Carbengle clay loam, 1 to 3 percent slopes. This moderately deep, gently sloping soil is on uplands. Individual areas are long and narrow and range from 15 to 60 acres.

Typically, the surface layer is very dark gray loam about 12 inches thick. The subsoil from 12 to 29 inches is pale brown silty clay loam that contains 50 percent carbonates. The underlying layer from 29 to 35 inches is white, slightly cemented sandstone. The soil is moderately alkaline and calcareous throughout.

The soil is well drained. Permeability is moderate. Available water capacity is low. Surface runoff is medium. Natural fertility is medium, and organic matter content is high. The hazard of erosion is moderate. The soil is easy to work because it has good drainage and permeability.

Included in some mapped areas of this soil are small amounts of Brenham and Renish soils. The Brenham soil is on the broader ridgetops. The Renish soil is on the upper slopes of hills. A soil which is similar to Carbengle soil but which is calcareous fine sandy loam and is on crests of hills are included. Included soils make up about 15 percent of mapped areas.

This soil is used mainly for pasture. Some mesquite, elm, ash, and hackberry trees are in these areas. Most areas have been cultivated in the past.

This soil has high potential for pasture. It is adapted to bermudagrass and kleingrass. It has medium potential for crops; however, terraces and grassed waterways are necessary to reduce erosion.

The soil has medium potential for most urban and recreational uses. The moderate depth to sandstone and high lime content are limitations.

This soil is in capability subclass IIe and the Clay Loam range site.

19—Carbengle clay loam, 3 to 5 percent slopes. This moderately deep, gently sloping soil is on uplands. Individual areas are long and narrow and range from 20 to 80 acres.

Typically, the surface layer is very dark gray clay loam about 12 inches thick. The subsoil from 12 to 34 inches is clay loam that is light gray in the upper part and white in the lower part and contains 50 percent carbonates. The underlying layer from 34 to 60 inches is a white, slightly cemented sandstone. The soil is moderately alkaline and calcareous throughout.

This soil is well drained. Runoff is medium. Permeability is moderate. Natural fertility and organic matter content are medium. Available water capacity is low. The hazard of water erosion is moderate.

Included in mapped areas of this soil are small amounts of Klump, Knolle, and Renish soils and a soil that is dark, calcareous fine sandy loam throughout. Also included are two soils that are similar to the Carbengle soil except one has a lighter colored surface layer and one has sandstone at a depth of 40 to 60 inches. Included soils make up about 15 percent of mapped areas.

This soil is used for pasture of improved bermudagrass or for rangeland. Most of these soils have been cultivated in the past.

This soil has high potential for forage production. It is well suited to improved bermudagrasses and kleingrass. It has medium potential for crops. Closely spaced crops, terracing, and grassed waterways are necessary to control erosion.

This soil has medium potential for urban and recreational use because of depth to rock and low strength, which affects roads and streets.

The soil is in capability subclass IIIe and the Clay Loam range site.

20—Carbengle clay loam, 5 to 8 percent slopes. This moderately deep, gently rolling soil is on uplands. Individual areas are long and narrow and range from 30 to 90 acres.

Typically, the surface layer is brown clay loam about 12 inches thick. The subsoil from 12 to 36 inches is yellowish brown clay loam that contains 50 percent carbonates. From 36 to 48 inches is white, slightly cemented sandstone. The soil is moderately alkaline and calcareous throughout.

This soil is well drained. Runoff is medium. Permeability is moderate. Natural fertility and organic

• Surface Water Intakes

TYPE OF WATER USES

1. MUNICIPAL/DOMESTIC
2. INDUSTRIAL
3. IRRIGATION
4. MINING
5. HYDROELECTRIC
6. NAVIGATION
7. RECREATION
8. OTHER
9. RECHARGE

TYPE OF WATER RIGHTS

1 - APPLICATION/PERMIT
2 - CLAIM
3 - CERTIFIED FILING
5 - DISMISSED/REJECTED
6 - CERTIFICATION OF ADJUDICATION
9 - CONTRACTUAL PERMIT/AGREEMENT

STATUS OF WATER RIGHTS

A - ADJUDICATED
P - PARTIALLY CANCELLED
R - DISMISSED/REJECTED
T - TOTALLY CANCELLED

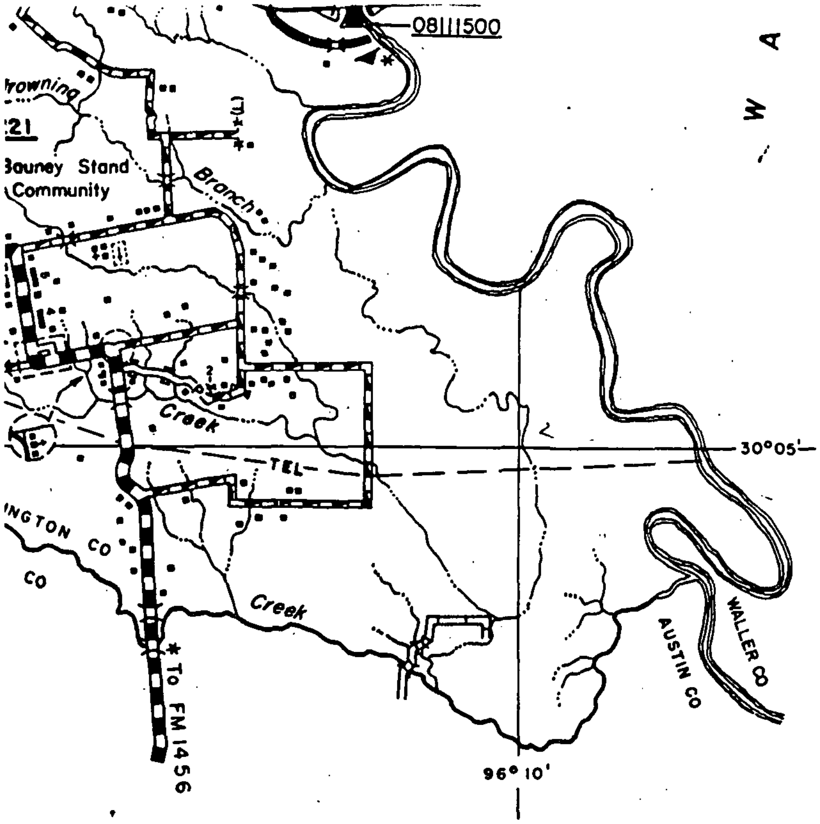
TERM STATUS

A - SPECIFIC DATE
B - NO SPECIFIC DATE
C - PERMIT TO BE REDUCED IF AWARDED A RIGHT UNDER CLAIM
D - NOT AUTHORIZED TO USE UNTIL AMENDED

BASIN CODES

1. CANADIAN
2. RED
3. SULPHUR
4. CYPRESS
5. SABINE
6. NECHES
7. NECHES-TRINITY
8. TRINITY
9. TRINITY-SAN JACINTO
10. SAN JACINTO
11. SAN JACINTO-BRAZOS
12. BRAZOS
13. BRAZOS-COLORADO
14. COLORADO
15. COLORADO-LAVACA
16. LAVACA
17. LAVACA-GUADALUPE
18. GUADALUPE
19. SAN ANTONIO
20. SAN ANTONIO-NUECES
21. NUECES
22. NUECES-RIO GRANDE
23. RIO GRANDE

STATUS	
NUMBER	
TYPE	
BASIN	
COUNTY	
RIVER ORDER NO.	
PERMIT NO.	
OWNER(S)	
STREAM	
TYPE OF USE	
AMOUNT OF WATER	
NUMBER OF ACRES	
PRIORITY DATE	
RESERVOIR CAPACITY	
DATE ISSUED	
TERM STATUS	



GENERAL HIGHWAY MAP

WASHINGTON COUNTY TEXAS

PREPARED BY THE

TEXAS STATE HIGHWAY DEPARTMENT
PLANNING AND RESEARCH DIVISION

IN COOPERATION WITH THE

U. S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

SCALE

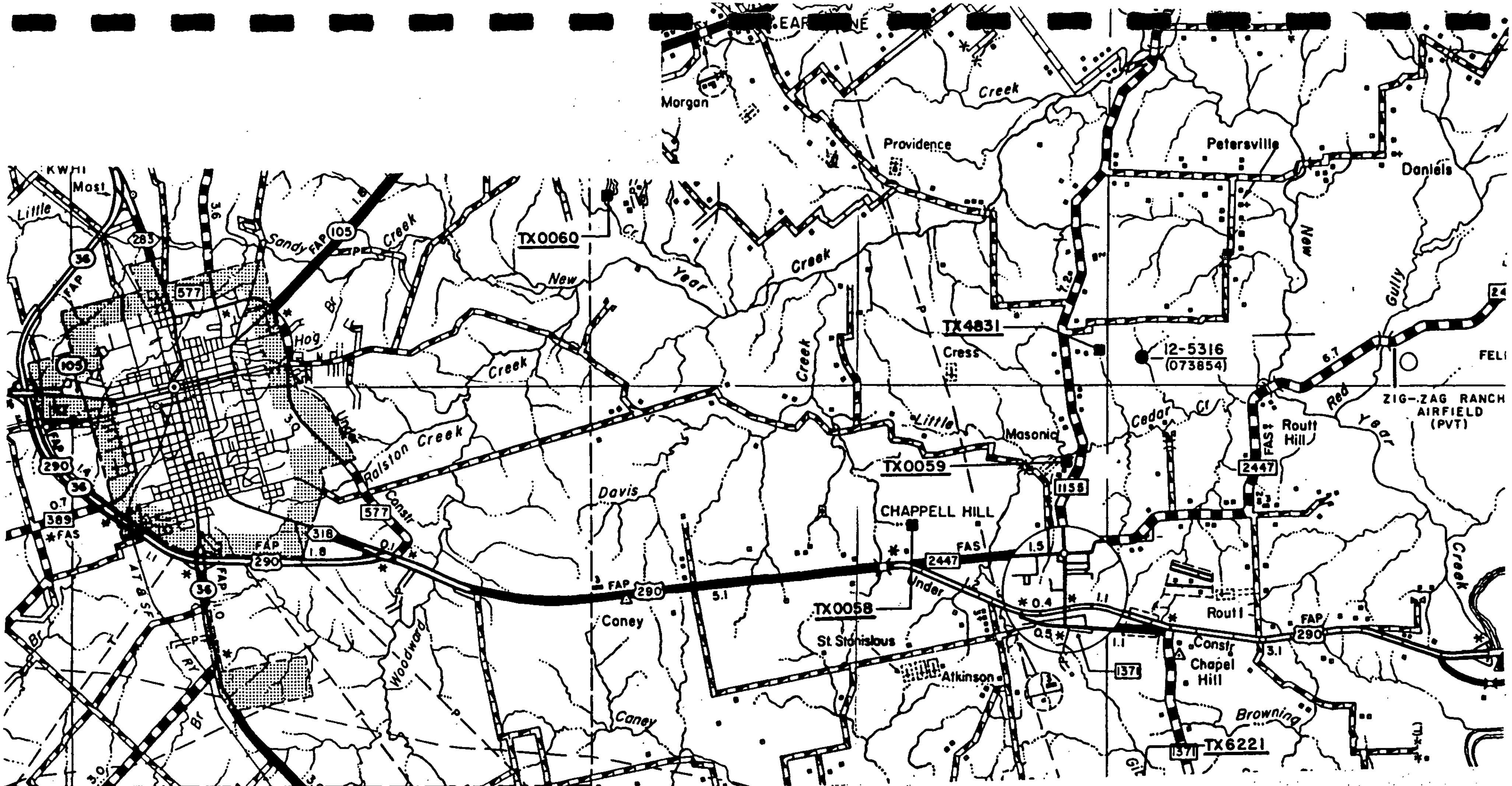
0 1 2 3 4 MILES

1968

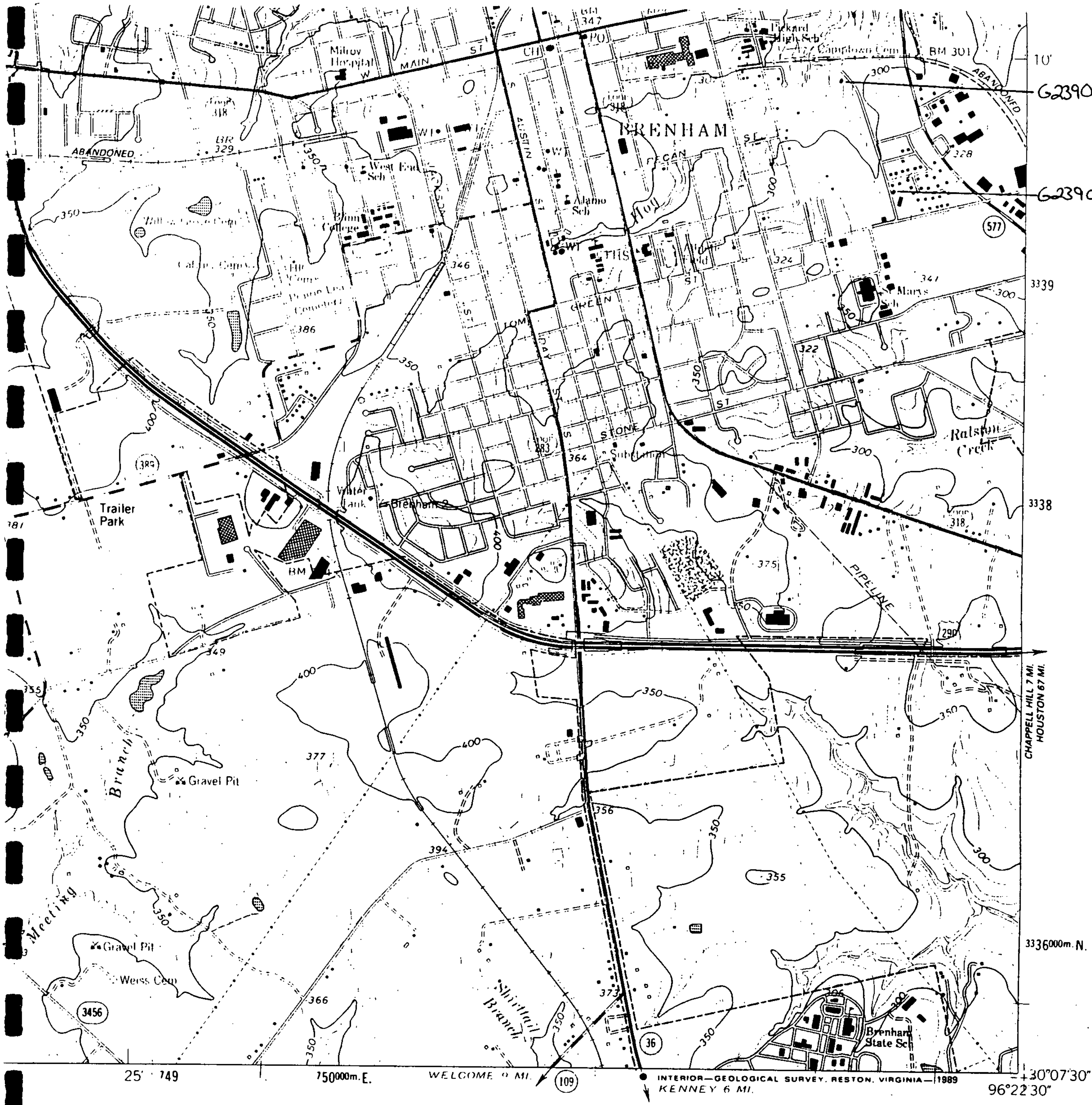
1970 CENSUS FIGURES

HIGHWAYS REVISED TO MARCH 1, 1975

Copies of this map are available for public use at nominal cost from the Texas Highway Department
P O Box 5051, Austin, Texas 78763



Morgan
Providence
Creek
Petersville
Daniels
Little
Most
Sandy
FAP
105
Creek
283
36
577
TX0060
New
Cr.
Year
Creek
New
Gully
Hog
Br
Creek
TX4831
Cress
12-5316
(073854)
105
Creek
Ralston Creek
Little
Masonic
ZIG-ZAG RANCH
AIRFIELD
(PVT)
Cedar
Cr
Routt
Hill
Red
Year
TX0059
1155
2447
FAS
290
36
389
FAS
Constr
577
Davis
CHAPPELL HILL
318
FAP
290
1.8
FAP
290
5.1
FAS
2447
1.5
TX0058
Under
Coney
St Stanislaus
Atkinson
Routt
FAP
290
Constr
Chapel
Hill
137
Woodward
Caney
Browning
TX6221
137
Creek
AT & SF
RY
Br



1 MILE

(KENNEY)
6744 III SE

ROAD CLASSIFICATION

Heavy-duty .... Light-duty ....

Medium-duty .... Unimproved dirt ....

U.S. Route   State Route

QUADRANGLE LOCATION

ref.

BRENHAM, TEX.

30096-B4-TF-024

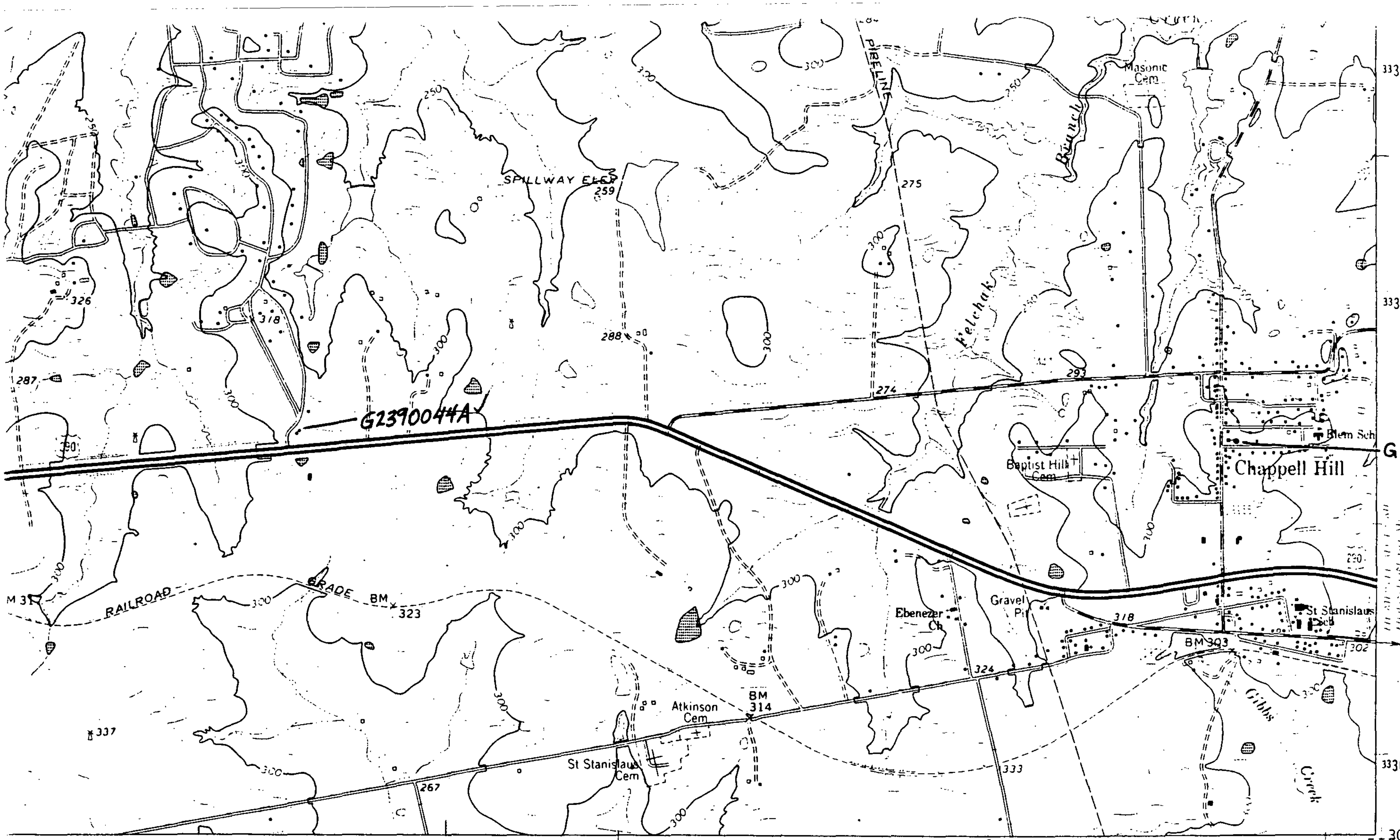
22092

3096-123

Pub. Supply Wells

1963
PHOTOREVISED 1989
DMA 6744 III NW–SERIES V882

T D
11 9



1000

1 MILE

4000 5000 6000 7000 FEET

1 KILOMETER

L 10 FEET
5-FOOT CONTOURS
AL DATUM OF 1929

(BUCKHORN)
6744 II SW

ROAD CLASSIFICATION

Heavy-duty
Light-duty
Medium-duty
Unimproved dirt
U.S. Route
State Route

QUADRANGLE LOCATION

CHAPPELL HILL, TEX.
30096-B3-TF-024

1963

MAP ACCURACY STANDARDS
.OGICAL SURVEY
RESTON, VIRGINIA 22092
[redacted] 309[redacted]4 [redacted] R[redacted]TOR[redacted]ED 1[redacted]

3-13-96

Population Estimates · Co. ... Forge Site

Co Area = 621.3 mi² Pop. = 26,...

(ref. 19)

... Area = 5.06 mi² Pop. = 11,...

5.38" × 6.5" = 2.05 × 2.47 mi = 5.06 mi

2.63" / 1 mile = 6.5 / x

Pop Density

Bremen 11,952 persons / 5.06 mi² = 2,362 persons/mi²

Co. outside Bremen: (26,154 − 11,952) / 621.3 mi² − 5.06 mi²

= 14,202 persons / 616.24 = 23 persons/mi²

All rural

0 − .25 mi: Area = πr^2 = π (.25 mi)² = .196 mi²

.196 mi² × 23 p/mi² = 4.5 = $\boxed{\text{5 people}}$

.25 − .5 mi: Urban Area = ½ × .15 × .35 = .026 mi²

.026 miles × 2,362 people/mi² = 62 people

Rural Area = 3.14 × (.5 mi)² = 0.785 mi²

0.785 mi² − 0.196 mi² (0 − .25 mi Area) − .026 mi² (urban Area) = 0.563 mi²

0.563 mi² × 23 people/mi² = 13 people

$\boxed{\text{75 people}}$

.5 − 1 mi: Urban Area = ½ × 1.1 × .75 = .413 mi² − .026 mi²

= 0.387 mi² × 2,362 people/mi² = 913 people

Rural Area = π × 1 mi² = 3.14 mi² − 0.785 mi² = 2.355 mi²

2.355 − 0.387 = 1.968 mi²

1.968 mi² × 23 = 45 people

$\boxed{\text{958 people}}$

Population Density

1-2 mi: Urban Area ≈ .25 of total Area

Total Area = $3.14 \times (2\,mi)^2 = 12.56\,mi^2$

1-2 mi area = $12.56\,mi^2 - 3.14\,mi^2 = 9.42\,mi^2$

Urban Area = $2.355\,mi^2 \times 2{,}362$ persons/mi^2 = 5,563 people

Rural Area = $.75 \times 9.42\,mi^2 = 7.065\,mi^2$ $\boxed{5{,}726}$ people

$7.065\,mi^2 \times 23$ people/mi^2 = 163 people

2-3 mi: Urban Area 2 triangles

a) $\frac{1}{2} \times 1.6 \times 1.2 = 0.96\,mi^2$

b) $\frac{1}{2} \times 1.2 \times 2.3 = 1.38\,mi^2$ → $2.34\,mi^2$

$2.34\,mi^2 \times 2{,}362$ persons/mi^2 = 5527 people

Rural Area

total = $3.14 \times (3\,mi)^2 = 28.26\,mi^2 - 12.56\,mi^2 = 15.7\,mi^2$

$15.7\,mi^2 - 2.34 = 13.36\,mi^2$ $\boxed{5{,}834}$ people

$13.36\,mi^2 \times 23$ = 307 people

3-4 mi: Urban Area = $\frac{1}{2} \times 0.7 \times 1.2 = 0.42\,mi^2$

$0.42\,mi^2 \times 2{,}362$ persons/mi^2 = 992 people

Rural Area total $3.14 \times (4\,mi)^2 = 50.24\,mi^2$

$50.24 - \underset{2\text{-}3\,mi}{28.26\,mi^2} = 21.98\,mi^2 - .42\,mi^2 = 21.56\,mi^2$

$21.56\,mi^2 \times 23$ persons/mi^2 = 496 people → $\boxed{1{,}488 \text{ persons}}$

total 4 mile radius $\boxed{14{,}086 \text{ people}}$

BRENHAM

Swbyp's®

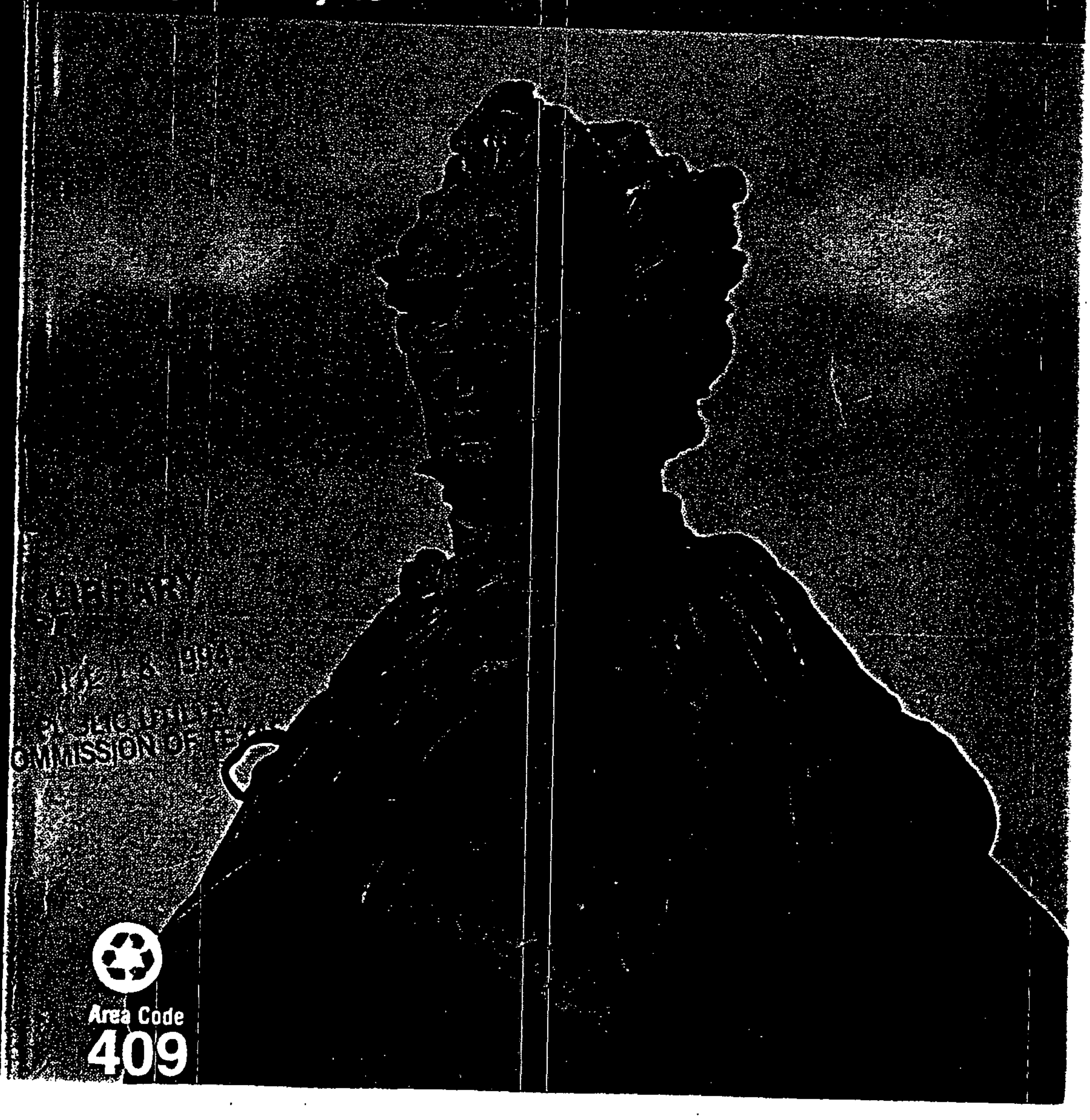
Southwestern Bell

Brenham

Burton

Content Listing Inside

Keep until July '95



Hwy 109 & Hwy 36 ---- **836-4610**

Brenham Christian Academy
504 E 6th St 77833 ---- 830-8480
BRENHAM CITY OF—
FIRE DEPARTMENT—
Emergencies Only ---- 911
Non-Emergencies ---- 836-5600
POLICE DEPARTMENT—
Emergencies Only ---- 911
Non-Emergencies ---- 836-2164
Narcotics Hotline ---- 836-1313
Airport County Road 65 ---- 836-8356
Animal Control 2007 E Alamo 77833 ---- 836-7949
Community Hall
101 N Chappel Hill St 77833 ---- 836-8320
Donald G Austin Memorial Animal
Shelter 2007 E Alamo 77833 ---- 836-8283
Humane Society 2007 E Alamo 77833 ---- 836-8283
Library 100 W Academy 77833 ---- 836-2312
Public Works ---- 836-7911
Central Warehouse 315 W 2nd St 77833 830-0879
Electric Department
410 W 2nd St 77833 ---- 836-3436
Water & Sewer Distribution
Department 301 Jeffries 77833 ---- 830-0037
Parks Department 909 Ewing St 77833 - 836-3141
Sanitation Department 1502 E Horton - 830-1245
Street Department 1502 E Horton 77833 836-4072
Vehicle Maintenance
1011 S Austin 77833 ---- 836-9237
Wastewater Treatment Plant
2005 E Alamo 77833 ---- 836-2746
Water Treatment Plant
1105 S Austin 77833 ---- 836-3751
Swimming Pool North Park ---- 836-0681
Utility & Billing Information
210 N Park 77833 ---- 836-7911
UTILITIES & NON-EMERGENCY
SERVICES—
After 5 PM & Weekends ---- 836-0027
Administrative Office 210 N Park 77833 - 836-7911
BRENHAM CLINIC—
Main Number 600 N Park 77833 ---- **836-6153**
APPOINTMENTS FOR—
Dr Giddings 600 N Park 77833 ---- 836-6153
All Others 600 N Park 77833 ---- 830-0532
Insurance Information 600 N Park 77833 830-0530
Brenham Collision Center
810 W Main Brenham 77833 ---- 277-0433
Brenham Country Catering Hwy 105 E ---- 836-1988
BRENHAM COUNTRY CLUB
Hwy 105 ---- **836-1733**
Brenham Credit Corp 101 W Alamo 77833 - 836-5661
Brenham Crime Stoppers
100 S Chappell Hill 77833 ---- 836-8477
Brenham Custom Floors
1807 S Horton 77833 ---- 836-4279
BRENHAM CUSTOM SCREENS
2418 S Market 77833 ---- **836-9257**
Brenham Electric Motor Service
800 S Horton 77833 ---- 836-2882
Brenham Elks Lodge No 979
400 Germania 77833 ---- 836-2261
BRENHAM EYE CLINIC
2007 S Day 77833 ---- **836-2313**
Brenham Fine Arts League Inc
113 W Alamo 77833 ---- 836-1622
Brenham Fire Department Training
Center Loop 290 E [redacted] 836-8614 [redacted]

Somerville Hwy ---- **836-5471**
Brenham Fitness Center
1113 Prairie Lea 77833 ---- 830-0929

BRENHAM FLORAL CO
2111 S Day 77833 ---- **836-3566**

Brenham Furniture Clinic
1301 Hwy 105 77833 ---- 830-8665
Brenham Gun & Rod Club—
Caretaker's Fm 577 ---- 836-9552
Clubhouse Fm 577 77833 ---- 836-0469
Brenham Hardware Co
307 N Austin Parkway 77833 ---- 836-5607
Brenham Head Start Center
305 W Valverde 77833 ---- 830-7037
Brenham Health Food Store
202 E Alamo 77833 ---- 836-1243
Brenham Heating & Air Conditioning Co
2305 S Market ---- 836-5653
Brenham Heritage Museum
105 S Market 77833 ---- 830-8445
Brenham House The 705 Clinton 77833 ---- 830-0477
BRENHAM HOUSING AUTHORITY—
1901 N View Circle Drive 77833 ---- **836-9221**
1003 Hasskarl Dr 77833 ---- 836-9222
Brenham Housing Authority Maintenance
1901 N View Circle Dr 77833 ---- 836-6931
Brenham Housing Complex
600 Pleasant View 77833 ---- 836-9204
Brenham Independence Allergy Clinic
Independence Hwy ---- 836-5582
Brenham Independent School District—
Administration Office
711 Mansfield 77833 ---- 836-5672
Tax Office 711 Mansfield 77833 ---- 836-5674
Business Office 711 Mansfield 77833 ---- 836-5672
Brenham Middle School FM 577 ---- 836-6122
Cub Stadium Press Box
1600 E Tom Green 77833 ---- 836-3395
Brenham Intermediate School
2201 E Stone 77833 ---- 836-7981
Alton Elementary School 304 Kerr 77833 836-4548
Brenham Elementary School
201 E 6th 77833 ---- 836-5629
Custodial Services 1301 S Market 77833 - 830-7193
Maintenance Department
307 E 6th 77833 ---- 836-6043
Transportation Department
307 E 6th 77833 ---- 836-3421
Community Education
1301 S Market 77833 ---- 836-1721
Alternative Classroom ---- 836-6536
Project Leap ---- 836-3620
Brenham High School
1200 Carlee Dr 77833 ---- 836-5611
Athletic Director
1600 E Tom Green 77833 ---- 830-0355
Voc Ed & Ag Dept 1200 Carlee Dr 77833 830-0366
Drama Dept 1200 Carlee Dr 77833 ---- 836-1973
Band Hall ---- 836-2361
Library ---- 830-8426
Brenham Industrial Foundation
314 S Austin 77833 ---- 836-8927
Brenham Industrial Foundation Inc
314 S Austin 77833 ---- 836-3695
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302 W Main 77833 ---- **836-2331**
Toll Free-Dial 1 & Then ---- 800 750-1754

BRENHAM LIVESTOCK AUCTION
Hwy 105 N ---- **836-3621**
BRENHAM MEMORIAL CHAPEL
509 S Baylor 77833 ---- **836-3611**
Brenham Mini Warehouses
2000 Loop 290 East 77833 ---- 836-0711
BRENHAM MOBILE WASH
407-1/2 S Market 77833 ---- **836-2697**
BRENHAM MONTESSORI SCHOOL 1500 S Baylor 77833 ---- **830-8790**
BRENHAM MONUMENT CO
2609 S Market 77833 ---- **836-2356**
Brenham National Bank 2211 S Day 77833 836-4571
Brenham Nephrology Inc
2536 S Day 77833 ---- 836-6391
BRENHAM OFFICE SUPPLY SERVICE INC 304 W Main 77833 ---- **836-5221**
Brenham One Hour Martinizing
805 S Market 77833 ---- 836-4356
Brenham Opportunity Center
901 Rink 77833 ---- 836-9379
Brenham Parcel Service 2413 S Day 77833 830-0674

BRENHAM PEST CONTROL
407 S Park 77833 ---- **836-6335**

Brenham Presbyterian Church
900 S Jackson 77833 ---- 836-7632
BRENHAM PRODUCE CO—
1103 S Market 77833 ---- 836-3277
1103 S Market 77833 ---- **836-3523**
Brenham Professional Services
105 W Academy 77833 ---- 830-8291
Brenham Quick Mart
1100 S Chappell Hill 77833 ---- 836-9421
BRENHAM RADIATOR SHOP
214 S Market 77833 ---- **836-5210**
Toll Free-Dial 1 & Then ---- 800 924-1753
BRENHAM READY MIX INC
Hwy 290 E ---- **830-1989**

BRENHAM REPAIR CENTER
2710 S Market 77833 ---- **836-0201**

BRENHAM REST HOME INC
406 Cottonwood 77833 ---- **836-3434**
BRENHAM ROOFING CORP
Loop 36 NW ---- **830-8571**
BRENHAM SADDLE SHOP INC
Highway 290 E ---- **836-6673**
Brenham Sausage Co
N Hwy 36 Chappell Hill ---- 836-3152
BRENHAM SCHOOL OF DANCE
2403 S Market 77833 ---- **836-6465**
Brenham Self-Storage Center
Loop 290 East ---- 836-0711
Brenham Sign Co Rt 5 77833 ---- 836-5715
Brenham State School Highway 36 South - 836-4511
Brenham Supply Co Hwy 290 E ---- 836-0976
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604 S Horton Brenham 77833 ---- **836-4**
BRENHAM TRAVEL SERVICE
522 W Masonic Dr 77833 ---- **830-1**
Brenham Trees 1110 Jackson 77833 ---- 836-
Toll Free Dial 1 & Then ---- 800 491-
Brenham Trophies & Award
1904 S Market 77833 ---- 836-
BRENHAM UPHOLSTERY & TRIM SHOP 1706 S Day 77833 ---- **836-2**
BRENHAM VETERINARY HOSPITAL Hwy 290 West ---- **836-2**
BRENHAM WHOLESALE GROCERY CO INC
602 W 1st St 77833 ---- **836-7**
Brenham Wholesale Jewelry
200 E Alamo 77833 ---- 836-
Brennan J J Independence ---- 836-
Brennan Mike & Kelli 1004 Windy Dr 77833 277-
Brenner Glenn R 805 Mark T Drive 77833 ---- 836-
Brensha Heights Apartments
Stonehollow & Airline 77833 ---- 830-
Brentex Construction Co
400 W Academy 77833 ---- 836-
Brentex Farm & Ranch Services
Hwy 105 ---- 836-
Toll Free Dial 1 & Then ---- 800 303-
BRENTEX MILLS INC
701 E Commerce 77833 ---- **836-5**
Brentex Truck Brokers
2905 Shadow Lawn 77833 ---- 836-
Bresler Louis 611 Robinhood Rd 77833 ---- 830-
Brewer Herbert J Prairie Hill ---- 836-
Brewer S W 902 E Tom Green 77833 ---- 836-
Brewton David Cr 38 77833 ---- 836-
Brezinski N S Cr 18 77833 ---- 830-
BRIAN'S CUSTOM CABINETS
403 S Park 77833 ---- **836-0**
Bridges Greg 2505 Gun And Rod Rd 77833 ---- 830-1
Brieden J A 1106 Hollis 77833 ---- 836-3
Brieden John 704 S Baylor 77833 ---- 836-1

BRIEDEN JOHN ins
2006 S Day 77833 ---- **836-43**

Brieden John Jr Hwy 290 E 77833 ---- 836-8
Brient Russell Sandy Hill ---- 836-0
Brier Victor Trey Lane ---- 836-9
Briggs Charlie 1708 Eledra 77833 ---- 836-1
Bright Earl Fm 109 ---- 836-3
Bright Edward L Bleiberville Rd 77833 ---- 277-0
Bright Edward O Hwy 290 77833 ---- 830-5

BILL BRILEY
AND ASSOCIATES
INSURANCE & INVESTMENTS

BRILEY BILL & ASSOCIATES INSURANCE & INVESTMENTS
803 South Market 77833 ---- **830-84**

Briley Bill W Hwy 36 N ---- 836-7
Brimberry Dan 907 W Main 77833 ---- 830-0
Brinkman A E 2102 Huisache 77833 ---- 836-26
Brinkman Alvin L 1305 Ewing 77833 ---- 836-72
Brin[redacted] Alvin[redacted]9c [redacted] 24